Chapter 4

ENVIRONMENTAL EFFECTS

4.1 INTRODUCTION

This chapter discusses the anticipated environmental consequences of each alternative considered in detail in Chapter 2. The four alternatives and two sub-alternatives addressed below are analyzed.

Under the **No Action Alternative**, the City's ROW application to develop the SVPP would not be approved. The SVPP would not be developed, and existing land uses in the project area would continue. The No Action Alternative forms the baseline against which the potential impacts of the Proposed Action and the other action alternatives are compared. Thus, it includes current actions and activities in the project area. No additional actions are assumed to occur in the absence of approval of any of the action alternatives.

Alternative A, the Proposed Action would stretch 15.7 miles from southern Goodyear to near Mobile, Arizona, generally bordering and running parallel to the SDNM until it connects with SR 238. This alternative would be located within an existing utility corridor (the EPNG utility corridor), identified in the *Lower Sonoran RMP* (BLM 2012).

Alternative C would be 18.1 miles in length, beginning at Riggs Road at the north end, turning a southerly direction for approximately 1.8 miles along Rainbow Valley Road. The proposed road would go directly east along Patterson Road for approximately 4 miles. The next section would proceed south along the Bullard Avenue alignment for approximately 3 miles, and finally head east and southeast for 5.4 miles.

Alternative H would be 18.3 miles in length, beginning at Riggs Road at the north end, then would travel south along Rainbow Valley Road for approximately 1.9 miles to Patterson Road. Alternative H would then turn east and follow Patterson Road for approximately 5.5 miles to the Dysart Avenue alignment (there currently is no Dysart Avenue roadway at this location), where the alignment would turn due south and then follow the SDNM boundary, terminating at SR 238.

Sub-alternative F is a sub-alternative that would only apply to the southern portions of the Parkway. Sub-alternative F is meant to provide an alternative for the southern portion of the proposed ROW that is common to Alternative A, C, and H. Sub-alternative F would be 2.8 miles in length and would begin approximately 3 miles north of SR 238 at the Komatke/Gas Pipeline Road and would follow the existing roadway south to SR 238. Sub-alternative F would be confined to the pre-existing Komatke/Gas Pipeline Road alignment. Sub-alternative F would be located just to the east of the existing pipeline, not on the pipeline itself. Sub-alternative F's total length is not included in Alternative A, C, or H; it is meant to provide an alternative for the southern terminus alignment only.

Sub-alternative G is a sub-alternative that would only apply to the southern portions of the Parkway. Sub-alternative G is meant to provide an alternative for the southern portion of the proposed ROW that is common to Alternative A, C, and H. Sub-alternative G would be 2.4 miles in length, and would begin approximately 3 miles north of SR 238 at the Komatke/Gas Pipeline Road. Sub-alternative G would leave the existing roadway and travel in a southwesterly direction across undeveloped BLM land in order to avoid a historical homestead site and to move the future SVPP interchange with SR 238 away from the Mobile area, farther to the west. Sub-alternative G would intersect with SR 238 approximately 1 mile west of the Proposed Action's terminus. Sub-alternative

G's total length is not included in Alternative A, C, or H; it is meant to provide an alternative for the southern terminus alignment only.

The analysis uses existing data, appropriate scientific methodologies, and professional judgment. The analysis takes into account the applicant-committed measures described in Chapter 2 (Section 2.5). Impacts from actions to be carried out under more than one alternative are discussed under the first applicable alternative. This discussion is then referenced under the other pertinent alternatives.

4.1.1 Types of Impacts to be Addressed

This chapter analyzes both beneficial and adverse impacts that would result from implementing any of the alternatives considered in this EIS. This chapter also includes definitions of impact thresholds for each resource, methods used to analyze impacts, and the analysis methods used for determining cumulative impacts. Table 4-1 provides standard definitions of degree and duration of impact that are broadly applicable to all resources; certain analyses in the sections that follow may further refine these definitions to be more specific to that particular resource.

Table 4-1. Standard Resources Impact Description

	Description Relative to Resource
Type	
Adverse	A change that moves the resource away from a desired condition or detracts from its appearance or condition.
Beneficial	A change that moves the resource toward a desired condition or improves its appearance or condition.
Context	
Site-specific	Impacts would occur in the footprint of the Parkway alignment.
Local	Impacts would occur in the Rainbow Valley.
Regional	Impacts would occur on lands administered by the BLM Lower Sonoran Field Office.
Magnitude	
No Impact	Would not produce measurable changes in baseline condition of the resources.
Negligible	Impacts would occur, but no measurable changes in baseline conditions would occur.
Minor	Impacts would occur, but resources would retain existing character and overall baseline conditions.
Moderate	Impacts would occur, but resources would partially retain existing character. Some baseline conditions would remain unchanged.
Major	Impacts would occur that would create a high degree of change within the existing resource character and overall condition of resources.
Duration	
Temporary	Up to 1 year
Short-term	1 to 4 years
Long-term	Greater than 4 years

For ease of reading, the impacts of the proposed SVPP on a specific resource under a particular alternative are generally characterized as no impact, minor, moderate, or major. This represents comparison to the status quo or baseline for that resource. However, in order to properly and meaningfully evaluate the impacts of each alternative, the impacts expected under that alternative should be measured against the impacts projected to occur under the No Action Alternative, which is the baseline for purposes of comparison of the alternatives to one another, as it represents the existing condition. That

is, the true impact of a particular action alternative is the difference between the impacts under Alternative A and that particular alternative. Whenever possible for a given resource, quantitative (i.e., numeric) values are assigned as a means of more objectively and accurately assessing the scope and intensity of potential impacts. For certain resources such as air, these values will be accepted regulatory standards such as NAAQS, or for resources such as water or soils, they may be standard units of measurement such as acres of land or acre-feet of water.

The following section defines and clarifies the concepts and terms used in this EIS when discussing the impacts assessment. The terms “impact” and “effect” are used synonymously.

Only those resources and resource uses that would potentially be impacted by any of the alternatives are brought forward for detailed analysis and discussed in Chapter 4. Impacts are defined as modifications to the existing environment brought about by implementing an alternative. Impacts can be beneficial or adverse in nature.

4.1.2 Direct and Indirect Impacts

Direct impacts are attributable to implementation of an alternative that affects a specific resource, and generally occur at the same time and place. Indirect impacts can result from one resource affecting another (e.g., soil erosion and sedimentation affecting water quality) or can occur later in time or removed in location, but can be reasonably expected to occur. Long-term impacts are those that would substantially remain for many years (more than 4 years) or for the life of the project. Short-term impacts result in changes to the environment that are stabilized or mitigated rapidly and without long-term effects (less than 4 years).

The analysis in this chapter provides a quantitative or qualitative comparison (dependant on available data and nature of the impact) between alternative impacts and establishes the severity of those impacts in the context of the existing environment. The discussion of each resource includes sections for specifically required disclosures under NEPA, including the disclosure of residual impacts, irreversible and irretrievable commitment of resources, and the impact of the project's short-term resource use on the long-term productivity of the project area. These required disclosures are explained in the sections below. All environmental consequences direct and indirect impact discussions are bounded by the analysis area, as defined per resource in Chapter 3, Affected Environment.

4.1.3 Cumulative Impacts

CEQ regulations for implementing NEPA define *cumulative impacts* as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions (RFA) regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7).

BLM’s NEPA Handbook states that the purpose of the cumulative effects analysis is to ensure the decision makers consider the full range of the consequences of the Proposed Action, alternatives to the Proposed Action, and No Action Alternative (BLM 2008a). Assessing the cumulative effects of the actions begins early in the NEPA process, during the identification of issues.

If the actions under each alternative have no direct or indirect effect on a resource then the cumulative impacts on that resource are not addressed. In any NEPA analysis, it is preferable to quantify the assessment of effects (changes) on each affected resource. This is true for direct, indirect, and cumulative

effects. Where possible, the analysis is quantified. Where quantification is not available, a meaningful and qualified judgment of cumulative effects is included to inform the public and the decision maker.

Cumulative impacts discussions are bounded both geographically and temporally. Analyzing cumulative effects differs from the traditional approach to direct and indirect impacts assessment because cumulative assessment requires expanded analysis to encompass additional effects to the natural, cultural, and human resources. As such, resources may have different cumulative impacts analysis area(s) since the conditions for assessing different resources may require larger or smaller analysis areas in order to capture the relevant concerns. All cumulative impact discussions may be bounded by a unique cumulative effects analysis area. Each resource analysis area for cumulative impacts are described below in the cumulative impacts section (Section 4.19, Cumulative Impacts).

Staff from the BLM interdisciplinary team (ID team) developed a list of the relevant cumulative actions that may have applicable effects to resource values and uses of the project area (see Appendix H, SVPP Cumulative Actions).

4.1.3.1 Residual Impacts

This section addresses impacts that cannot be avoided by the application of mitigation measures. The mitigation measures identified in Chapter 4 consist of potential mitigation (including measures outside the jurisdiction of the lead or cooperating agency) that could be implemented to address impacts that would result from the project's implementation. The residual impacts section therefore discloses the effectiveness of proposed mitigation measures for each resource, and helps the decision maker identify those mitigation measures to be included in the ROD.

4.1.3.2 Irretrievable and Irreversible Commitments of Resources

Irreversible and irretrievable commitments of resources (in other words, irreversible and irretrievable impacts) are disclosed in this chapter for each resource. Irreversible impacts are those impacts that would result in changes to the environment that cannot be reversed, reclaimed, or repaired. An example of an irreversible impact would be the removal of groundwater from a poorly recharged aquifer. Once groundwater reserves are removed, they cannot be replaced or reclaimed. Irretrievable impacts are those impacts that result in the temporary loss or degradation of the resource value until reclamation is successfully completed.

4.1.3.3 Relationship of Short-term Uses to Long-term Productivity

This section describes how the short-term project use would affect the long-term productivity of a given resource.

4.1.4 Regulation Requirements, Mitigation and Monitoring Measures

All Parkway operations would comply with pertinent state, federal, and local laws, ordinances, regulations, and standards. Because LORS are generally specific to a resource, they are presented in Chapter 3 (Affected Environment) of this EIS, which describes the current environment and its management. In addition, Section 1.7 (Relationship to Policies, Plans, and Programs) summarizes existing state, federal, and local requirements that would be required under any of the alternatives. Regulatory requirements, mitigation and monitoring measures, and applicant-committed environmental protection measures particular to each resource are also identified in specific resource sections.

4.1.5 General Analytical Assumptions, Guidelines, and Notes

The following are the general assumptions used for assessment under all alternatives. Assumptions associated with a given resource (e.g., wildlife habitat) are included within the impact analysis for that resource.

- For all action alternatives, direct and indirect impacts are analyzed under a scenario for each potential phase of the proposed SVPP: two lanes, four lanes, and six lanes, including construction and operation.
- Short-term impacts are those that would last fewer than 4 years (construction period).
- Long-term impacts are those that would last 4 years or more (operational, or post-construction period).
- Acreages were calculated using GIS technology; there may be slight variations in total acres between resources. These variations are negligible and do not affect analysis.
- All acreages and percentages presented in this chapter pertain to all lands in the project area (rather than only BLM lands), unless otherwise specified.

4.2 AIR RESOURCES

4.2.1 Analysis Area, Approach and Assumptions

Direct and indirect impacts to existing air quality resulting from the SVPP are analyzed within the bounds of each 1-mile section crossed by the action alternatives and the No Action Alternative as shown in Figure 3-1. This area of analysis has been selected to account for potential air quality impacts to existing areas of frequent and extended exterior use (receptors) in the project area. The environmental consequences analyzed consider the compatibility of the alternatives with both existing receptors and applicable planning documents governing the use of project lands as they relate to receptors. Cumulative impacts to receptors are analyzed within the boundaries of the SVPA, defined in the *Sonoran Valley Planning Area Proposed Major General Plan Amendment* (City 2007).

It is assumed that no uses other than transportation are planned in the project area. Impacts to receptors resulting from the No Action Alternative and from implementation of the SVPP (action alternatives) are discussed in terms of the potential to increase concentrations of NAAQS criteria pollutants CO, O_3, $PM_{10,}$ and $PM_{2.5}$ above current monitored levels at existing and planned locations. The potential of project alternatives to increase Mobile Source Air Toxics emissions is also discussed.

4.2.2 No Action

The No Action Alternative assumes that the SVPP would not be completed; however, other transportation improvements identified in the City General Plan Amendment (City 2007), including the widening of SR 238 and the expansion of the local roadway network, would occur. Dispersed outdoor recreation including the use of OHVs would continue.

As detailed in Section 3.11, land use types within the air quality analysis area include detached single-family residences and/or mobile homes, one school, and several undeveloped parcels. The approximate

distance of the No Action and action alternatives to the nearest land use by type is summarized in Table 4-2.

Table 4-2. Proximity of Air Quality Receptors to the No Action and SVPP Action Alternatives

Affected Land Use Type	Closest Receptor Location by Type and Potential Impacts									
	Alternative A (the BLM Preferred Alternative)		Alternative C		Alternative H		Sub-alternative F		Sub-alternative G (the BLM Preferred Sub-alternative)	
Residential	**No.**	**Location**	**No.**	**Location**	**No.**	**Location**	**No.**	**Location**	**No.**	**Location**
Detached single-family homes and mobile homes	1	2,800 feet	16	At ROW	2	At ROW	1	At ROW	1	7,500 feet
Schools	1	2,400 feet	1	2,400 feet	1	2,400 feet	1	1,400 feet	1	6,000 feet
Outdoor Recreation (hunting, target shooting, back-country driving, mountain biking, natural and cultural resources study, and sightseeing)	Various	Locations throughout project area. Activities occurring within the SDNM bordered by 9.2-mile segment of SVPP.	Various	Locations throughout project area including SDNM	Various	Locations throughout project area including SDNM	Various	Locations throughout project area including SDNM	Various	Locations throughout project area including SDNM

4.2.2.1 Carbon Monoxide and Ozone

Portions of the air quality analysis area lie within the Phoenix CO Maintenance Area and the Phoenix 8-Hour O_3 Non-Attainment Area as shown in Figure 3-3. The MCAQD does not currently operate any air quality monitoring stations in the project area. The closest MCAQD-operated station is located in Buckeye, near the intersection of SR 85 and Buckeye Road (Site #21525). The most recent ambient concentration monitoring data at this site indicate that the 1-hour and 8-hour NAAQS for CO and the 8-hour NAAQS for O_3 are attained (see Table 3-3). Due to the relatively long distance to the nearest receptor and the current attainment/maintenance status of the project area, localized concentrations of CO and O_3 would not increase under the No Action Alternative and attainment of the NAAQS for these two criteria pollutants would be achieved.

4.2.2.2 Particulates

Portions of the air quality analysis area lie within the Phoenix Non-Attainment Area for PM_{10} and $PM_{2.5}$ as shown in Figure 3-3. The methodology used to determine the potential of this project to cause a new violation or increase the frequency or severity of an existing PM_{10} violation per 40 CFR 93.101 involves 1) comparison of project elements to similar roadways and area characteristics where ambient particulate concentrations are known, and 2) reference to current studies of PM_{10} conformity. Primary sources of PM_{10} from roadway facilities include vehicle tailpipe emissions, brake wear, tire wear, re-entrained road dust, and construction. 40 CFR 93.123(c)(5) does not require the inclusion of temporary emissions from roadway construction in a PM_{10} “hot-spot" analysis. Similarly, secondary particles formed from

precursors to PM_{10} emissions are not included in the analysis due to their temporary nature. Therefore, this qualitative analysis of project alternatives focuses only on vehicular and roadway surface sources and uses current estimates and future projections of peak hour traffic volumes on project roadway segments as a proxy for PM_{10} emissions.

Table 4-3 shows the maximum traffic segments for the No Action and action alternatives and Table 4-4 shows the PM_{10} concentrations near different roadway types in urban and rural areas of Maricopa County including the Buckeye Site. This station is situated in a rural area adjacent to agricultural land. In 2008, four exceedances of the 24-hour PM_{10} were recorded. These exceedances have been noted as exceptional events, which in agricultural areas are typically caused by weather-related events such as wind-blown dust. The MCAQD also operates monitoring stations in more urbanized settings, such as the Durango Complex located at 27th Avenue and Durango Street, and the Central Phoenix site located at 19th Avenue and Roosevelt Street. In 2008, two exceedances of the 24-hour PM_{10} standard occurred at the 27th Avenue and Durango Street site as a result of exceptional events, while no exceedances were recorded for the Central Phoenix site located at 19th Avenue and Roosevelt Street.

Table 4-3. Maximum Traffic Segments and Vehicle Miles Traveled

Alternative	Number of Lanes	Average Daily Traffic*	Vehicle Miles Traveled	Percentage Trucks†	Level of Service
No Action	–	–	–	–	–
Alternative A (BLM Preferred Alternative)	2	24,000	377,280	5%	C
	4	48,000	754,560	5%	C
	6	72,000	1,131,840	5%	C
Alternative C	2	24,000	434,880	5%	C
	4	48,000	869,760	5%	C
	6	72,000	1,304,640	5%	C
Alternative H	2	24,000	438,720	5%	C
	4	48,000	877,440	5%	C
	6	72,000	1,316,160	5%	C

* Based on LOS C traffic volumes for two-lane Parkway at 55 mph (Highway Capacity Manual 2000); four- and six-lane Parkways are conservatively estimated by multiplying two-lane Parkway values by 2 and 3, respectively.

† Based on *Draft Air Quality Analysis for SR 303L, SR 801 to I-10* (ADOT 2008a).

For the purpose of determining potential PM_{10} impacts associated with this project, the Central Phoenix site was chosen based on its proximity to the I-10/SR 51/SR 202L traffic interchange (TI). This TI connects an interstate with two state routes in a multilevel directional ramp structure with at-grade and below-grade freeway mainline segments and has a configuration that includes design elements similar to the proposed project. The area surrounding the I-10/SR 51/SR 202L TI includes commercial, light industrial, and residential uses as well as municipal uses and office buildings not found in the project area. MAG traffic counts for 2007 indicate that the highest traffic volumes occur on the portion of the I-10 that forms the western leg of the TI. The approximate volume for this segment of the I-10 is 290,000 vehicles for the average weekday.

Table 4-4. PM_{10} Concentrations for Different Roadway Types in Urban and Rural Areas of Maricopa County, 2008

Location	PM_{10} Concentrations ($\mu g/m^3$)			Number of Exceedances	Nearest Roadway	Distance from Roadway	Average Daily Traffic	Percentage Trucks
	Maximum 24-hour	Second Maximum 24-hour	Annual Average					
Urban locations adjacent to freeways (less than or equal to 0.5 mile)								
Central Phoenix (19th and Roosevelt)	133*	116	35.3	0	I-10	0.25 mile	291,000	6 (7–8)†
Urban locations removed from freeways (greater than 0.5 mile)								
Durango Complex (27th Avenue and Durango Street)	247*	169	48.2	2	I-17	0.75 mile	119,000	6 (7–8)†
Rural locations								
Buckeye (MC 85 and SR 85)	223*	203*	43.2	4	N/A	N/A	N/A	N/A

Source: Arizona Department of Environmental Quality (2009a).
* Exceptional event that exceeds NAAQS.
† Percentages in parentheses reported in SR 801, SR 303L to SR 202L (ADOT 2008a).

By comparison, the No Action Alternative (based on the Traffic Analysis Report for the SVPA [City 2006]) represents 87% of the I-10 volumes (252,500 vehicles; 3,969,300 VMT). Therefore, it is not likely that any new violations of PM_{10} standards would occur due to the No Action Alternative. However, projected truck volumes, and potential diesel particulate emissions, under the No Action Alternative are similar to I-10 volumes.

There are no $PM_{2.5}$ monitors near the project area. ADEQ reported data for five monitors in Maricopa County for the 2008 calendar year. None of the five monitors reported any exceedances of either the annual or 24-hour standards of the $PM_{2.5}$ NAAQS (12 $\mu g/m^3$ and 35 $\mu g/m^3$, respectively) for 2008. The highest reported annual value was from the South Phoenix monitor with an annual $PM_{2.5}$ value of 10.93 $\mu g/m^3$. The highest reported 24-hour average value was from the West Phoenix (1) Monitor with a 24-hour maximum value of 29.1 $\mu g/m^3$.

4.2.2.3 Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. MSATs are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

EPA regulations for vehicle engines and fuels will cause overall MSAT emission to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOBILE6.2 model forecasts a combined reduction of 72% in the total annual emission rate for the priority MSATs from 1999 to 2050, while vehicle-miles of travel are projected to increase by 145%.

In February 2007, EPA issued the final rule to reduce hazardous air pollutants from mobile sources. The final standards will lower emissions of benzene and other air toxics in three ways: 1) by lowering the benzene content in gasoline, 2) by reducing exhaust emissions from passenger vehicles operated at cold temperatures, and 3) by reducing emissions that evaporate from, and permeate through, portable fuel containers.

Under this rule, EPA has required that, since the beginning of 2011, refiners must meet an annual average gasoline benzene content standard of 0.62% by volume on all gasoline (the national benzene content of gasoline today is about 1.0% by volume).

In addition, EPA is adopting new standards to reduce non-methane hydrocarbon exhaust emissions from new gasoline-fueled passenger vehicles at colder temperature below 75°F. Non-methane hydrocarbons include many MSATs, such as benzene. Finally, the February 2007 rule establishes standards that will limit hydrocarbon emissions that evaporate or permeate through portable fuel containers such as gas cans.

EPA expects that the new fuel benzene standard and hydrocarbon standards for vehicles and gas cans will together reduce total emissions of MSATs by 330,000 tons in 2030, including 61,000 tons of benzene. As a result of this rule, new passenger vehicles will emit 45% less benzene, gas cans will emit 78% less benzene, and gasoline will have 38% less benzene overall. In addition, the hydrocarbon reductions from the vehicles and gas can standards will reduce VOC emissions (which are precursors to O_3 and can be precursors to $PM_{2.5}$) by over 1 million tons in 2030. The vehicle standards will reduce direct $PM_{2.5}$ emissions by 19,000 tons in 2030, and could also reduce secondary formation of $PM_{2.5}$. Once the regulation is fully implemented, EPA estimates that these PM reductions will prevent nearly 900 premature deaths annually.

Unavailable Information for Project-specific MSAT Impact Analysis

This Draft EIS presents a qualitative analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable the prediction of the project-specific health impacts of the emission changes associated with the alternatives in this Draft EIS. Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22[b]) regarding incomplete or unavailable information.

Information that is Unavailable or Incomplete

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

1. Dispersion: The tools to predict how MSATs disperse are also limited. The EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion modeling is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. The National Cooperative Highway Research Program (NCHRP) is conducting testing of MSATs. The NCHRP's work will also focus on identifying appropriate methods of documenting and communicating MSAT impacts in the

NEPA process and to the general public. Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

2. Exposure Levels and Health Effects: Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

As discussed above, technical shortcomings of dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (Claggett and Miller 2011).

For each alternative in this Draft EIS, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same for each alternative.

4.2.3 Impacts Common to all Action Alternatives

The 250-foot ROW is the same for each alternative (Alternatives A, C, and H, and Sub-alternatives F and G) and Parkway (two-lane, four-lane, and six-lane) analyzed, and includes 25-foot-wide drainage easements on both sides. The Parkway design speed is 65 mph and the posted speed limit would be 55 mph for all analyzed proposed alternatives and Parkway designs.

4.2.3.1 Two-lane Parkway

A two-lane road is proposed with a total Parkway width of 44 feet, which includes a 28-foot-wide paved surface with 8-foot-wide graded shoulders. Based on the annual average daily traffic (ADT) for a two-lane Parkway at 55 mph, a maximum of 24,000 vehicles per day is expected for all action alternatives.

4.2.3.2 Four-lane Parkway

For the expansion of the two-lane Parkway into the four-lane Parkway, the Parkway would have a total Parkway width of 200 feet, including a 112-foot median separating two 28-foot-wide paved surfaces with 8-foot-wide graded shoulders. Based on the AADT for a four-lane Parkway at 55 mph, a maximum of 48,000 vehicles per day is expected for all action alternatives.

4.2.3.3 Six-lane Parkway

If the four-lane Parkway is later expanded into a six-lane Parkway, the total Parkway width would be 200 feet, which includes an 84-foot median separating two 42-foot-wide paved surfaces with 8-foot-wide graded shoulders. Based on the AADT for a six-lane Parkway at 55 mph, a maximum of 72,000 vehicles per day is expected for all action alternatives.

Transportation Conformity

To demonstrate conformity, the project alternatives considered must be consistent with state and local transportation plans and demonstrate that they would not adversely affect the attainment of the primary and secondary NAAQS for criteria pollutants. As shown in Table 4-5, the implementation of all alternatives and sub-alternatives (Alternatives A, C, and H, and Sub-alternatives F and G) meet the stated goals and objectives of the City General Plan Amendment (City 2007), the MAG Regional Transportation Plan (MAG 2003), and the State Implementation Plan via federal statute (40 CFR 51).

Table 4-5. Consistency of the Project with Local Transportation Plans

Plan	Goals/Objectives/Policy	Consistency Determination
Sonoran Valley Planning Area City of Goodyear General Plan Amendment	Recognizes the need to "provide southern vehicular access and mobility for the forecasts for growth in the West Valley, and the limited connectivity that currently exists in Western Maricopa County" (City 2007).	Consistent because the General Plan was amended to provide for Parkway, infrastructure, and services expansion in Rainbow Valley. Planned facility is an interim two-lane minor collector with future expansion to six-lane major arterial.
MAG Regional Transportation Plan	Goal # 2: Access and Mobility discusses the objective of providing safety, access, and maintaining a reliable and acceptable level of service (MAG 2007c).	Consistent because the project would bring the existing, unacceptable conditions into compliance with the MAG Plan.

Mobile Source Air Toxics

Because the estimated VMT between each of the alternatives varies by less than 15% (with the exception of the No Action Alternative, see Table 4-3), it is expected there would be no appreciable difference in overall MSAT emissions among the three action alternatives. Also, regardless of the alternative chosen, emissions would likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57% to 87% between 2000 and 2020. Local conditions may differ from these national projections in terms of the fleet mix and the turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

Construction activity may generate a temporary increase in MSAT emissions. Project-level assessments that render a decision to pursue construction emission mitigation would benefit from a number of technologies and operational practices that should help lower short-term MSATs. In addition, the Safe,

Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) has emphasized a host of diesel retrofit technologies in the law's CMAQ provisions-technologies that are designed to lessen a number of MSATs (FHWA 2005).

Construction mitigation includes strategies that reduce engine activity or reduce emissions per unit of operating time. Operational agreements that reduce or redirect work or shift times to avoid community exposure can have positive benefits when sites are near vulnerable populations. For example, agreements that stress work activity outside normal hours of an adjacent school campus would be operations-orientated mitigation. Also on the construction emissions front, technological adjustments to equipment, such as off-road dump trucks and bulldozers, could be appropriate strategies. These technological fixes could include particulate matter traps, oxidation catalysts, and other devices that provide an after-treatment of exhaust emissions. The use of clean fuels, such as ultra–low sulfur diesel, also can be a very cost-beneficial strategy.

The EPA has listed a number of approved diesel retrofit technologies; many of these can be deployed as emissions mitigation measures for equipment used in construction. This listing can be found at EPA (2012).

4.2.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

Alternative A is 15.7 miles long. Based on the Parkway length and the AADT, the maximum estimated VMT for the two-, four-, and six-lane Parkway scenarios is 377,280, 754,560, and 1,131,840 VMT, respectively.

4.2.4.1 Carbon Monoxide and Ozone

The nearest receptor, which is located at the Mobile Elementary School, is 2,400 feet from the Alternative A alignment. Concentrations of CO would increase from existing ambient levels due to SVPP peak hour traffic; however, because of the relatively large distance to the nearest receptor and the current attainment/maintenance status of the project area, the NAAQS for this criteria pollutant would be attained. It is difficult to quantify project contributions to local O_3 levels; however, because it is a regional pollutant and dependent upon precursors such as NOx and VOCs, they would likely be minor. Therefore, the impact for potentially sensitive receptors would be long-term but negligible.

4.2.4.2 Particulates

Based on VMT, Alternative A represents an increase of less than 10% of the No Action Alternative potential PM_{10} and $PM_{2.5}$ emissions. Therefore, it is not likely that any new violations of PM_{10} or $PM_{2.5}$ standards would occur in the vicinity of the proposed Alternative A alignment. Therefore, the impact for potentially sensitive receptors would be long-term but negligible.

The operation of Alternative A may result in indirect air quality impacts to existing and planned receptors if the Parkway creates land use amendments brought on by development interest. Future development would increase the proximity of the improved Parkway network to existing and planned receptors in the project area, creating the potential for increases in local CO and PM_{10} concentrations.

4.2.5 Alternative C Direct and Indirect Impacts

Alternative C is 18.1 miles long. Based on the Parkway length and the AADT, the maximum estimated VMT for the two-, four-, and six-lane Parkway scenarios is 434,880, 869,760, and 1,304,640 VMT, respectively.

4.2.5.1 Carbon Monoxide and Ozone

The impacts to existing receptors under Alternative C would be similar to those described for Alternative A, except near a group of single-family homes located east of Bullard Avenue (see Figure 3-1). The ROW for Alternative C is within several feet of these receptors. Concentrations of CO would increase from existing ambient levels due to SVPP peak hour traffic, especially if there is a planned signalized intersection of the SVPP with Bullard Avenue where vehicles queues would be created. It is difficult to quantify project contributions to local O_3 concentrations; however, because it is a regional pollutant and dependent upon precursors such as NOx and VOCs, they would likely be minor. Therefore, the impact for potentially sensitive receptors would be long-term but negligible.

4.2.5.2 Particulates

Identical to Alternative A, the Alternative C alignment with maximum potential PM_{10} and $PM_{2.5}$ emissions would carry less than 10% of the vehicle traffic projected for the No Action Alternative. Therefore, it is not likely that any new violations of PM_{10} or $PM_{2.5}$ standards would occur in the vicinity of the proposed Alternative C alignment. The impact for potentially sensitive receptors would be long-term but negligible.

The operation of Alternative C may result in indirect air quality impacts to existing and planned receptors if the Parkway creates land use amendments brought on by development interest. Future development would increase the proximity of the improved roadway network to existing and planned receptors in the project area, creating the potential for increases in local PM_{10} concentrations.

4.2.6 Alternative H Direct and Indirect Impacts

Alternative H is 18.3 miles long. Based on the Parkway length and the AADT, the maximum estimated VMT for the two-, four-, and six-lane Parkway scenarios is 438,720, 877,440, and 1,316,160 VMT, respectively.

4.2.6.1 Carbon Monoxide and Ozone

The Mobile Elementary School is also the nearest receptor from Alternative H, at 2,400 feet from the proposed alignment. The impacts to existing receptors under Alternative H would be the same as described for Alternatives A and C, with the exception of avoiding most of the SDNM and with some residential development along the ROW to the east of South Bullard Avenue along the southern boundary of West Patterson Road. It is difficult to quantify project contributions to local O_3 concentrations; however, because it is a regional pollutant and dependent upon precursors such as NOx and VOCs, they would likely be minor. Therefore, the impact for potentially sensitive receptors would be long-term but negligible.

4.2.6.2 Particulates

Identical to Alternatives A and C, the Alternative H alignment with maximum potential PM_{10} and $PM_{2.5}$ emissions would carry less than 10% of the vehicle traffic projected for the No Action Alternative. Therefore, it is not likely that any new violations of PM_{10} or $PM_{2.5}$ standards would occur in the vicinity of the proposed Alternative H alignment. The impact for potentially sensitive receptors would be long-term but negligible.

As with Alternatives A and C, the operation of Alternative H may result in indirect air quality impacts to planned receptors if the Parkway creates land use amendments brought on by development interest. Future development would increase the proximity of the improved roadway network to existing and planned receptors in the project area, creating the potential for increases in local PM_{10} concentrations.

4.2.7 Sub-alternative F Direct and Indirect Impacts

Sub-alternative F is a possible rerouting of the southern portion of the Parkway. This rerouting would not represent a substantial increase in the length of the Parkway, and therefore would not substantively increase the VMT or the emissions for the Parkway.

4.2.7.1 Carbon Monoxide and Ozone

The impacts to existing receptors under Sub-alternative F would be similar to those described for Alternatives A, C, and H, except near a group of single-family homes located northeast of the intersection of 98th Avenue and Powhatan Road (see Figure 3-1). The ROW for Sub-alternative F is within several feet of these receptors. Concentrations of CO would increase from existing ambient levels due to SVPP peak hour traffic. It is difficult to quantify project contributions to local O_3 concentrations; however, because it is a regional pollutant and dependent upon precursors such as NOx and VOCs, they would likely be minor. Therefore, the impact for potentially sensitive receptors would be long-term but negligible.

4.2.7.2 Particulates

Identical to Alternatives A, C, and H, the Sub-alternative F alignment with maximum potential PM_{10} and $PM_{2.5}$ emissions would carry less than 10% of the vehicle traffic projected for the No Action Alternative. Therefore, it is not likely that any new violations of PM_{10} or $PM_{2.5}$ standards would occur in the vicinity of the proposed Sub-alternative F alignment. The impact for potentially sensitive receptors would be long-term but negligible.

The operation of Sub-alternative F may result in indirect air quality impacts to existing and planned receptors if the Parkway creates land use amendments brought on by development interest. Future development would increase the proximity of the improved roadway network to existing and planned receptors in the project area, creating the potential for increases in local PM_{10} concentrations.

4.2.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

Like Sub-alternative F, Sub-alternative G (the BLM Preferred Sub-alternative) is a possible rerouting of the southern portion of the Parkway. This rerouting would not represent a substantial increase in the

length of the Parkway, and therefore would not substantively increase the VMT or the emissions for the Parkway.

4.2.8.1 Carbon Monoxide and Ozone

The impacts to existing receptors under Sub-alternative G would be similar to those described for Alternative A, with the nearest receptor the Mobile Elementary School located at approximately 6,000 feet from the proposed alignment. Concentrations of CO would increase from existing ambient levels due to SVPP peak hour traffic. It is difficult to quantify project contributions to local O_3 concentrations; however, because it is a regional pollutant and dependent upon precursors such as NOx and VOCs, they would likely be minor. Therefore, the impact for potentially sensitive receptors would be long-term but negligible.

4.2.8.2 Particulates

Identical to Alternatives A, C, and H and Sub-alternative F, the Sub-alternative G alignment with maximum potential PM_{10} and $PM_{2.5}$ emissions would carry less than 10% of the vehicle traffic projected for the No Action Alternative. Therefore, it is not likely that any new violations of PM_{10} or $PM_{2.5}$ standards would occur in the vicinity of the proposed Sub-alternative G alignment. The impact for potentially sensitive receptors would be long-term but negligible.

The operation of Sub-alternative G may result in indirect air quality impacts to existing and planned receptors if the SVPP creates land use amendments brought on by development interest. Future development would increase the proximity of the improved roadway network to existing and planned receptors in the project area, creating the potential for increases in local PM_{10} concentrations.

4.2.9 Additional Mitigation Measures

Rules 310 and 310.01 of the MCAQR include work practice standards to ensure that emissions from fugitive dust sources, such as open areas, vacant lots, unpaved parking lots, and unpaved roadways, are minimized to the extent practicable. An earthmoving permit and a dust control plan are required for any operations that disturb a total surface area equal to or greater than 0.10 acre. No additional mitigation measures are suggested.

As the specific construction activity equipment roster is unknown at this time, emissions of criteria pollutants and MSATs cannot be quantified. As such, it is also unknown whether or not mitigation of construction emissions would need to be undertaken. The possible need for construction equipment mitigation measures would be evaluated when actual construction activities are known.

4.2.10 Residual Impacts

Because no additional mitigation measures are suggested, the residual impacts to air quality would be the same as discussed under all action alternatives.

4.2.11 Short-term Uses versus Long-term Productivity

Under all action alternatives, certain parcels in the project area would be converted from their existing undeveloped condition to transportation uses. The current productivity of the area in terms of air quality is

one with minor contributions from intermittent mobile pollutant sources operating in the project area comprising residential and recreational vehicle use.

Although there would be a loss in the capability of the project area to provide air quality conditions relatively free of mobile pollutant sources, the new transportation network would provide paved roadways that will reduce particulate emissions and better dispersion of CO due to reduced travel times for the traveling public.

4.2.12 Irreversible and Irretrievable Commitment of Resources

There would be an irretrievable loss of local ambient air quality if the SVPP were implemented, due to the presence of commuter and recreational traffic on a paved Parkway. There may be an irreversible commitment of local ambient air quality because the SVPP could enable residential development and expansion of the transportation system in the area.

4.3 CULTURAL AND HERITAGE RESOURCES

4.3.1 Analysis Area, Approach and Assumptions

The cultural resources analysis area for the SVPP consists of 1,746 acres of private, BLM, and ASLD lands, and includes the total construction and operational impact footprints of proposed Alternative A (the BLM Preferred Alternative), Alternative C, Alternative H, Sub-alternative F, and Sub-alternative G (the BLM Preferred Sub-alternative), as well as the Temporary Access Road. Three NRHP-eligible historic properties have been identified in the analysis area–the Lung Homestead, AZ T:15:94(ASM), and the Butterfield Overland Stage Route. In addition, the Juan Bautista de Anza National Historic Trail corridor crosses the analysis area.

Portions of Alternative H, Sub-alternative F, and Sub-alternative G have not been surveyed. For the purposes of the analysis it is assumed that no NRHP-eligible cultural resources are located in the unsurveyed areas; however, if Alternative H, Sub-alternative F, or Sub-alternative G is chosen for development, a Class III pedestrian survey will need to be conducted to confirm the lack of resources. Please note that any adverse effects to all NRHP-eligible cultural resources in the selected alternative will be mitigated, regardless of alternative.

The following analysis assumes that all ground-disturbing activities would be confined to the project footprint (250-foot-wide ROW) for each action alternative and that only the three historic properties (Lung Homestead, AZ T:15:94(ASM), and Butterfield Overland Stage Route) are eligible for the NRHP.

Given the non-renewable nature of heritage resources—particularly archaeological sites and architectural structures—removing or damaging any portion of them diminishes their cultural and scientific value permanently. For the purposes of this analysis, there is no difference between temporary disturbance (short-term impacts; i.e., construction) or permanent disturbance (long-term impacts; i.e., operational). All disturbances to archaeological sites are considered permanent. Disturbance of artifacts and features would affect a site's NRHP eligibility.

4.3.2 No Action

Under the No Action alternative, the ROW application for the SVPP under Alternative A, Alternative C, Alternative H, Sub-alternative F, or Sub-alternative G would not be approved. The SVPP would not be built and there would be no adverse direct or indirect effect to cultural resources.

If SVPP is not built, the public would continue to try to use the pipeline road as an access route into this area of Rainbow Valley and the SDNM. This would keep the level of visitation to sites in the vicinity much lower than highway access.

4.3.3 Impacts Common to all Action Alternatives

All action alternatives and all phases of Parkway construction would adversely directly and indirectly impact the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor. Direct impacts include disruption of the connectivity of each resource and the disturbance of the physical remains of the Butterfield Overland Stage Route; however, the amount of disturbance would vary by alternative. The SVPP would cross both the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT, which would hamper access for hikers who are following either trail; however, both resources would maintain their overall character. Lack of public access to these historic trails would be a permanent, direct impact upon recreational use. Direct impacts to each trail would be adverse, site-specific, and long-term.

Indirect impacts include visual and auditory impacts to the setting of the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor. The Parkway would be seen and heard by visitors to either resource outside of the immediate footprint of the Parkway (see Section 3.7 Visual Resources and Section 3.16 Noise for further discussion).

4.3.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

Under Alternative A, the BLM Preferred Alternative, up to 220.1 acres (permanent) and 39.4 acres (temporary) would be disturbed during the construction of the SVPP. Alternative A would directly and indirectly impact the three known historic properties (Lung Homestead, AZ T:15:94[ASM], and the Butterfield Overland Stage Route), as well as the Juan Bautista de Anza NHT corridor and Management Area.

Measures for mitigating the adverse effects to the Lung Homestead, AZ T:15:94(ASM), and the Butterfield Overland Stage Route may include such options as data recovery, artifact analysis, archival research, interpretative signage, Parkway crossovers, and vehicle parking for trail access; measures for the adverse effects to the Juan Bautista de Anza NHT corridor may include interpretative signage, Parkway crossovers, and vehicle parking for trail access

4.3.4.1 Two-lane Parkway

Under Alternative A, ground disturbance from the Phase One, two-lane Parkway would consist of 178.3 acres of permanent and 39.4 acres of temporary disturbance, for a total of 217.7 acres.

Less than 2 acres of the 73-acre Lung Homestead and less than 146 linear feet of the Butterfield Overland Stage Route would be directly impacted by ground disturbance. In addition, 12.4 acres of the Juan Bautista de Anza NHT corridor would also be directly impacted. As stated in Section 4.3.3, direct impacts

to the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor would be adverse, site specific, and long-term.

All three resources would be indirectly impacted by the two-lane Parkway. The Lung Homestead may see indirect impacts from increased visitation to the area.

The two-lane Parkway would have an indirect visual and auditory impact on the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor and Management Area. The Parkway would be visible to visitors to either resource from the valley floor, impacting the trails' setting. Visitors would hear traffic on the Parkway, which would adversely impact their overall experience of the trails.

There would be no direct impact to AZ T:15:94(ASM); however, there may be indirect impacts from increased visitation by the public.

4.3.4.2 Four-lane Parkway

Under Alternative A, the ground disturbance from the Phase Two, four-lane Parkway would consist of 206.5 acres (167.1 permanent and 39.4 temporary).

Site AZ T:11:94(ASM) would be directly impacted by the four-lane Parkway; permanent disturbance of 0.09 acre, or 80% of the site, is expected.

For the Lung Homestead, 3.5 acres would be impacted by ground disturbance. Almost 300 feet (293.3) of the Butterfield Overland Stage Route would be impacted and approximately 25 acres of the Juan Bautista de Anza NHT corridor and Management Area would be impacted.

As with the two-lane Parkway, ground disturbance to all the resources is adverse, site-specific, and long-term. Because the four-line Parkway would disturb 80% of the site, the impact to AZ T:11:94(ASM) is major in magnitude. Impact magnitude to the Lung Homestead would be moderate; minor impacts to the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor and Management Area are expected.

Indirect impacts to the resources will be similar to those described for the two-lane Parkway.

4.3.4.3 Six-lane Parkway

The total ground disturbance from the Phase Three, six-lane Parkway would consist of 259.5 acres (220.1 permanent and 39.4 temporary).

All of AZ T:11:94(ASM) (about 1.1 acres) would be permanently disturbed by the six-lane Parkway. Less than 4 acres would be permanently disturbed by the six-lane Parkway. A total of 330.4 linear feet of the Butterfield Overland Stage Route and 28.2 acres of the Juan Bautista de Anza NHT corridor and Management Area would be directly impacted. Impacts to all resources would be adverse, site-specific, and long-term and with similar magnitudes as for the four-lane Parkway.

Indirect impacts to the resources will be similar to those described for the two-lane Parkway.

4.3.5 Alternative C Direct and Indirect Impacts

Under Alternative C, up to 254.5 acres would be disturbed by the construction of the SVPP. There would be no impacts to AZ T:15:94(ASM). Direct and indirect impacts to the Lung Homestead, the Butterfield

Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A, because Alternative C shares the same corridor through those resources.

4.3.5.1 Two-lane Parkway

Under Alternative C, ground disturbance (permanent and temporary) from the Phase One, two-lane Parkway would total 141.9 acres. Direct and indirect impacts for the two-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A.

4.3.5.2 Four-lane Parkway

Under Alternative C, ground disturbance (permanent and temporary) from the Phase Two, four-lane Parkway would total 238.5 acres. Direct and indirect impacts for the four-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT and Management Area corridor would be the same as those described under Alternative A.

4.3.5.3 Six-lane Parkway

Under Alternative C, ground disturbance (permanent and temporary) from the Phase Three, six-lane Parkway would total 299.9 acres. Direct and indirect impacts for the six-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A.

4.3.6 Alternative H Direct and Indirect Impacts

Under Alternative H, ground disturbance (permanent and temporary) from the Phase Three, six-lane Parkway would total 437.2 acres. Direct and indirect impacts for the six-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A, because Alternative H shares the same corridor through those resources.

4.3.6.1 Two-lane Parkway

Under Alternative H, ground disturbance (permanent and temporary) from the Phase One, two-lane Parkway would total 143.2 acres. Direct and indirect impacts for the two-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A.

4.3.6.2 Four-lane Parkway

Under Alternative H, ground disturbance (permanent and temporary) from the Phase Two, four-lane Parkway would total 240.8 acres. Direct and indirect impacts for the four-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A.

4.3.6.3 Six-lane Parkway

Under Alternative H, ground disturbance (permanent and temporary) from the Phase Three, six-lane Parkway would total 437.2 acres. Direct and indirect impacts for the six-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A.

4.3.7 Sub-alternative F Direct and Indirect Impacts

Under Sub-alternative F, total ground disturbance would be 106.0 acres (96.8 acres permanent and 9.2 acres temporary). Sub-alternative F was designed to avoid impacts to the Lung Homestead and consists of a 2.8-mile diversion around the site; therefore, there are no impacts to the Lung Homestead. Sub-alternative F would also not impact AZ T:15:94(ASM); however, both the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor and Management Area would be impacted by Sub-alternative F.

4.3.7.1 Two-lane Parkway

The two-lane phase of Sub-alternative F would disturb a total of 26.2 acres (9.2 acres temporary and 17.0 acres permanent). The two-lane phase would disturb 151.8 feet of the Butterfield Overland Stage Route and 14.2 acres of the Juan Bautista de Anza NHT corridor and Management Area. Similar to Alternatives A, C, and H, direct impacts to these two resources would be adverse, site-specific, minor, and long-term, but to a slightly greater degree. Indirect impacts would also be similar to Alternatives A, C, and H.

The Lung Homestead and AZ T:11:94(ASM) would not be impacted.

4.3.7.2 Four-lane Parkway

The four-lane phase of Sub-alternative F would disturb a total of 43.3 acres (9.2 acres temporary and 34.1 acres permanent). The four-lane phase would disturb 304.3 feet of the Butterfield Overland Stage Route and 28.6 acres of the Juan Bautista de Anza NHT corridor and Management Area. Overall, impacts to these resources would be similar to Alternatives A, C, and H but to a slightly greater degree.

The Lung Homestead and AZ T:11:94(ASM) would not be impacted.

4.3.7.3 Six-lane Parkway

Under Sub-alternative F, the six-lane Parkway phase would disturb a total of 106 acres. The six-lane phase would disturb 342.4 feet of the Butterfield Overland Stage Route and 32.3 acres of the Juan Bautista de Anza NHT corridor and Management Area. Overall, impacts to these resources would be similar to Alternatives A, C, and H but to a slightly greater degree.

The Lung Homestead and AZ T:11:94(ASM) would not be impacted.

4.3.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

Under Sub-alternative G (the BLM Preferred Sub-alternative), up to 79.2 acres (72.0 acres permanent and 7.2 acres temporary) would be disturbed. Like Sub-alternative F, Sub-alternative G was designed to avoid

impacts to the Lung Homestead and consists of 2.4 miles diverting around the site; therefore, there are no impacts to the Lung Homestead. Like Sub-alternative F, Sub-alternative G would also not impact AZ T:15:94(ASM); however, both the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor and Management Area would be impacted by Sub-alternative G.

4.3.8.1 Two-lane Parkway

The two-lane phase of Sub-alternative G would disturb a total of 19.9 acres (7.2 acres temporary and 12.7 acres permanent). The two-lane phase would disturb 124.8 feet of the Butterfield Overland Stage Route and 11.9 acres of the Juan Bautista de Anza NHT corridor and Management Area. Similar to Alternatives A, C, and H, direct impacts to these two resources would be adverse, site-specific, minor, and long-term but to a slightly lesser degree. Indirect impacts would also be similar to Alternatives A, C, and H.

The Lung Homestead and AZ T:11:94(ASM) would not be impacted.

4.3.8.2 Four-lane Parkway

Under Sub-alternative G, the four-lane phase would disturb a total of 32.5 acres (7.2 acres temporary and 25.3 acres permanent). The four-lane phase would disturb 247 feet of the Butterfield Overland Stage Route and 24 acres of the Juan Bautista de Anza NHT corridor and Management Area. Overall, impacts to these resources would be similar to Alternatives A, C, and H but to a slightly lesser degree.

Like the two-lane Parkway phase, the Lung Homestead and AZ T:11:94(ASM) would not be impacted.

4.3.8.3 Six-lane Parkway

Under Sub-alternative G, the six-lane Parkway phase would disturb a total of 79.2 acres. The six-lane phase would disturb 278 feet of the Butterfield Overland Stage Route and 28 acres of the Juan Bautista de Anza NHT corridor and Management Area. Overall, impacts to these resources would be similar to Alternatives A, C, and H but to a slightly lesser degree.

The Lung Homestead and AZ T:11:94(ASM) would not be impacted.

4.3.9 Mitigation Measures

Mitigation measures should be outlined in a treatment plan and a Memorandum of Agreement would need to be prepared and agreed to by all interested parties.

Mitigation of adverse impacts to AZ T:15:94(ASM) and the Lung Homestead would consist of a data recovery program. The data recovery may include but is not limited to surface artifact analysis, excavations, oral history, and archival research. Data recovery may also apply to the Butterfield Overland Stage Route. Artifacts removed during data recovery would be stored at a designated facility such as the Arizona State Museum.

Mitigation of adverse impacts to the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT may include crossovers or other pedestrian crossings of the Parkway for hikers, parking areas along the Parkway to allow access to the trails, access trails from the parking areas, and informative signage about the history and importance of the trails. Additional mitigation measures, if appropriate, would be identified by the decision-maker in the ROD.

4.3.10 Residual Impacts

Residual impacts to cultural resources in the analysis area would consist of all visual and auditory indirect impacts; these impacts to the setting of the resources would remain once the Parkway is constructed.

4.3.11 Short-term Uses versus Long-term Productivity

Because all direct and indirect impacts to cultural resources are permanent, all direct and indirect impacts are considered long-term.

4.3.12 Irreversible and Irretrievable Commitment of Resources

All ground disturbances to cultural resources are irreversible commitments of resources, because it represents the removal of resources from the landscape. There would not be any irretrievable impacts on cultural resources as a result of the project.

4.4 PALEONTOLOGICAL RESOURCES

4.4.1 Analysis Area, Approach and Assumptions

The analysis area for paleontological resources consists of the ROW corridors for all alternatives and sub-alternatives. All ground-disturbing activities that could affect paleontological resources will be confined to the ROW. The analysis assumes that the BLM's PFYC system is the appropriate method for assessing the potential presence of fossils in the analysis area and that the entire analysis area has a PFYC classification of 2, or low potential for paleontological resources.

4.4.2 No Action

Under the No Action Alternative, the SVPP would not be constructed and current land uses would continue. Little to no impact is expected to paleontological resources under the No Action Alternative. Current land uses such as grazing and recreation are unlikely to disturb any fossils, as the area has a low potential for paleontological resources (PFYC 2).

4.4.3 Impacts Common to all Action Alternatives

As stated in Section 3.4, the entire analysis area has a PFYC rating of 2. This rating suggests that the geologic units present in the analysis area are unlikely to contain vertebrate fossils or scientifically significant nonvertebrate fossils. A PFYC 2 does not require construction monitoring due to the low probability of encountering fossils. Because the low PFYC rating of the analysis area means that the presence of paleontological resources is unlikely, there would be no anticipated direct or indirect impacts to paleontological resources associated with construction of the SVPP under any alternative and regardless of the number of lanes constructed.

4.4.4 Potential Mitigation Measures

Construction workers responsible for ground-disturbing activities could be instructed to recognize paleontological resources and the protocol to enact upon discovery. Any discoveries would be treated in accordance with the Paleontological Resources Protection Act of 2009.

4.4.5 Residual Impacts

Residual impacts remaining after potential mitigation measures would be beneficial because the specialized training of construction workers would result in recognition and protection of fossils if they are discovered during ground-disturbing activities.

4.4.6 Short-term Uses versus Long-term Productivity

Because the geological formations present in the analysis area are unlikely to contain fossils, the SVPP would not result in any impacts to long-term productivity of paleontological resources.

4.4.7 Irreversible and Irretrievable Commitment of Resources

Because the analysis area is unlikely to contain paleontological resources, the SVPP will not result in any irreversible and irretrievable commitment of resources.

4.5 SOIL RESOURCES

4.5.1 Analysis Area, Approach and Assumptions

Direct and indirect impacts to topography, geology, and soils resulting from the SVPP are analyzed within the 250-foot-wide project ROW for soils and the Rainbow Valley for topography and geology. This area of analysis was selected to account for potential direct and indirect impacts to existing resources. Environmental consequences analyzed consider the compatibility of the alternatives with known characteristics of the resources. Impacts to soil resources under each alternative are discussed below, and cumulative impacts are analyzed in the Rainbow Valley area of analysis, discussed in Section 4.5.9.

It is assumed that there would be no other use of the project area, except for transportation. Other utilities (i.e., transmission lines, gas pipelines, future roadways) would be located within the EPNG multi-use utility corridor but outside the SVPP proposed ROW (see Figure 3-17). Impacts to topography, geology, and soils in the area of analysis from implementation of SVPP are discussed in terms of changes from the existing use.

4.5.2 No Action

Under the No Action alternative, the land on which the project is proposed would continue to be managed under the existing conditions. Current activities in the area, which primarily involve livestock grazing, agriculture, and dispersed recreational use, would not result in significant impacts to topography, geology,

and soils within the project area. The status of existing topographic, geologic, and soil resources described in Section 3.5 would remain unchanged. Much of the project area is vacant land. Land in the immediate vicinity of the project area and alternatives would remain primarily open desert under the No Action Alternative.

Other actions in the surrounding area, such as SR 303L construction, Hassayampa Freeway construction, various pipelines, and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa may result in their own direct and indirect impacts to local resources, but would not affect the topography, geology, or soils in the project area.

4.5.3 Impacts Common to all Action Alternatives

4.5.3.1 Topography

Direct or indirect impacts to the general topography of the project area, such as elevation and overall slope, would not occur under any variant of the project alternatives. The project area does not cross hills that would need to be cut or graded down, or valleys that would need to be filled. Microtopography would necessarily be altered within the project area, to build the road bed, provide fill for culvert and wildlife crossings, and maintain consistent grades. These changes are not considered major and would not have direct or indirect impacts to the larger vicinity of the project area. Numerous unnamed dry washes cross the project area, flowing northeast towards Waterman Wash, which flows into the Gila River at the north end of Rainbow Valley (approximately 10 miles north of the analysis area). Potential impacts to these washes are described below in Section 4.8.

4.5.3.2 Geology

Similarly, construction and operation of the project would not directly or indirectly affect local geology and geologic events under any variant of the project alternatives. The geologic setting of the project area is described in Section 3.5.4. No quaternary faults or folds are mapped in the vicinity of the project, and the project is mapped in an area of very low seismic hazard (USGS 2008; see Appendix E, Geologic Maps). The project will not contribute to increased seismic hazards in the project area. The project does not include groundwater withdrawal, and therefore the project would not contribute to accelerated land subsidence or the creation of fissures in the project area. Landslides are not expected to be a factor for this project because there are no steep slopes on or adjacent to the project. A seismic hazards map, a map of quaternary faults and folds, and an earthquake probability map are included in Appendix E, Geologic Maps.

Because impacts to topography and geology are not anticipated under any proposed variation of the SVPP, only impacts to soils will be discussed herein.

4.5.3.3 Soils

Under each alternative, short-term disturbance of at least 39 acres of soils would occur, resulting in a conversion from natural soils (as well as dirt roads and a small amount of farmland) to a construction right-of-way. Each alternative also includes a 1.4-acre temporary construction easement. Direct impacts would result from clearing of vegetation, grading, and compaction. Some of the soil is likely to contain native biological soil crusts. Indirect impacts to soils within the project area are not anticipated.

Much of the area disturbed during construction would be reclaimed, resulting in long-term impacts to the footprints of only paved roadway and graded shoulders. Long-term impacts to soils would include the

loss of soil productivity within these areas due to preclusion of access to the soil. The quantity of long-term impacts would vary by alternative and phase.

The corridors of all proposed alternatives run through similar soil types that are common to alluvial valleys. Any soil reclamation efforts on the project would be limited by the droughty climate and the poor tilth, potentially high salt content, and low organic matter content of local soils (NRCS 1974, 1977, 1997). The effects of these limitations on soil resources would include increased potential for erosion and a much longer time period for revegetation to occur. Properly implemented BMPs for soil stabilization, and a reclamation and revegetation plan, would serve to minimize these effects to the extent practicable for these poor soils.

Temporary impacts would occur to at least 39.4 acres of soil under any alternative. Permanent impacts would affect approximately 84 acres of soil for a two-lane Parkway, 167 acres for a four-lane Parkway, and 220 acres for a six-lane Parkway. The types of impacts are described above. The maximum amount of native soil that would be permanently disturbed within a maintained ROW is anticipated to be 553.9 acres.

4.5.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.5.4.1 Soils

Under Alternative A, the BLM Preferred Alternative, short-term disturbance would occur along a 15.7-mile corridor, and would total 39.4 acres. Short-term disturbance would result in a conversion from natural soils (as well as dirt roads and a small amount of farmland) to a graded and otherwise disturbed construction corridor. Direct impacts would result from clearing of vegetation, grading, and compaction. Indirect impacts to soils within the project area are not anticipated.

Much of the area disturbed during construction would be reclaimed, resulting in long-term impacts to a corridor between 44 and 116 feet wide (depending on the phase) comprising paved Parkway and graded median and shoulders within a 250-foot-wide ROW. Impacts would result from the clearing of vegetation, grading, compaction, and from construction of the Parkway. Long-term impacts to soils would include the loss of soil productivity within the transportation corridor due to preclusion of access to the soil. The short-term and permanent impacts to soils under Alternative A are described in Table 4-6 below.

Table 4-6. Short-term and Permanent Impacts to Soils under Alternative A, by Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Temporary Impacts	39.4	39.4	39.4
Permanent Impacts	83.6	167.1	220.1
Total Disturbed Area	123.0	206.5	259.5
Permanent ROW	474.8	474.8	474.8

4.5.5 Alternative C Direct and Indirect Impacts

Qualitatively, the short-term and permanent, direct and indirect impacts to soils under Alternative C would be substantially the same as described under Alternative A. However, at 18.1 miles in length, the

corridor of Alternative C is approximately 15% longer than that of Alternative A and the area of soil disturbed would be commensurately larger. The short-term and permanent impacts to soils under Alternative C are described in Table 4-7 below.

Table 4-7. Short-term and Permanent Impacts to Soils under Alternative C, by Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Temporary Impacts	45.4	45.4	45.4
Permanent Impacts	96.5	193.1	254.5
Total Disturbed Area	141.9	238.5	299.9
Permanent ROW	548.5	548.5	548.5

4.5.6 Alternative H Direct and Indirect Impacts

Qualitatively, the short-term and permanent, direct and indirect impacts to soils under Alternative H would be substantially the same as described under Alternative A. At 18.3 miles in length, the corridor of Alternative H is approximately the same length as that of Alternative C, but is 16% longer than that of Alternative A. The area of soil disturbed would be commensurately larger. The short-term and permanent impacts to soils under Alternative H are described in Table 4-8 below.

Table 4-8. Short-term and Permanent Impacts to Soils under Alternative H, by Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Temporary Impacts	45.7	45.7	45.7
Permanent Impacts	97.5	195.1	391.5
Total Disturbed Area	143.2	240.8	437.2
Permanent ROW	553.9	553.9	553.9

4.5.7 Sub-alternative F Direct and Indirect Impacts

Qualitatively, the short-term and permanent, direct and indirect impacts to natural soils under Sub-alternative F would be substantially the same as the segment it would replace. However, at 2.8 miles in length (versus 2.4 miles for the segment it would replace), the corridor of Sub-alternative F is approximately 16% longer and the area of soil disturbed thus commensurately larger. The impact would occur wholly on private lands. The short-term and permanent impacts to soils under Sub-alternative F are described in Table 4-9 below.

Table 4-9. Short-term and Permanent Impacts to Soils under Sub-alternative F, by Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Temporary Impacts	9.2	9.2	9.2
Permanent Impacts	17.0	34.1	96.8
Total Disturbed Area	26.2	43.3	106.0
Permanent ROW	96.8	96.8	96.8

4.5.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

Qualitatively, Sub-alternative G's short-term and permanent, direct and indirect impacts to natural soils would be substantially the same as the segment it would replace. At 2.4 miles in length (versus 2.4 miles for the segment it would replace), the corridor of Sub-alternative G is approximately the same and the area of soil disturbed thus the same. The impact would occur wholly on private lands. The short-term and permanent impacts to soils under Sub-alternative G are described in Table 4-10 below.

Table 4-10. Short-term and Permanent Impacts to Soils under Sub-alternative G, by Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Temporary Impacts	7.2	7.2	7.2
Permanent Impacts	12.7	25.3	72.0
Total Disturbed Area	19.9	32.5	79.2
Permanent ROW	72.0	72.0	72.0

The preferred Alternative (Alternative A) and the preferred Sub-alternative (Sub-alternative G) would result in impacts as described in Table 4-11 below.

Table 4-11. Short-term and Permanent Impacts to Soils under Alternative A and Sub-alternative G, by Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Temporary Impacts	46.6	46.6	46.6
Permanent Impacts	96.3	192.4	292.1
Total Disturbed Area	142.9	239	338.7
Permanent ROW	546.8	546.8	546.8

4.5.9 Additional Mitigation Measures

No mitigation measures for topographic or geologic resources are needed under any of the action alternatives. Regarding soil, all soil reclamation efforts on the project would be limited by the droughty climate and the poor tilth, potentially high salt content, and low organic matter content of local soils (NRCS 1977). The effects of these limitations on soil resources would include increased potential for erosion and a much longer time period for revegetation to occur. Properly implemented BMPs for soil stabilization (described in a SWPPP), and a reclamation and revegetation plan, would serve to minimize these effects to the extent practicable for these poor soils.

A soil reclamation and revegetation plan and a SWPPP would be in place before construction begins, and would include soil conservation measures and measures to salvage topsoil and biological soil crusts for use in restoration activities. The basic principle of a SWPPP is that construction project operators must identify areas and activities that may contribute pollutants to stormwater and must implement BMPs to minimize those pollutants. The primary pollutant from construction sites is sediment discharges from increased erosion. Adequate and effective erosion and sediment control BMPs must be used to minimize sediment discharges. The SWPPP describes how the site will be managed and monitored, and describes

the BMPs that will be implemented to help ensure pollutants, including soil sediment, do not reach surface waters. BMPs may include stormwater controls, erosion and sediment controls, good housekeeping practices, stabilization practices, structural practices, non-stormwater discharge management, and other controls (e.g., off-site tracking of soils and dust management) (ADEQ 2008b).

A reclamation plan would typically include descriptions of the BMPs to be utilized for erosion control on or from the affected lands. It would also identify how topsoil and biological soil crusts would be salvaged, stored, and replaced in order to properly revegetate the area. It would identify soil types, the slopes of the reclaimed areas, and precipitation rates. Based on this information, the reclamation plan would identify the seed species, seeding rates, the time and method of planting the soil, and fertilizer and mulch requirements. The plan would also describe mitigating the loss of biological soil crusts and enhancing vegetation establishment by inoculating soils with native soil crusts during vegetation restoration. Lastly, the plan would outline weed and invasive species management, and the requirements for long-term monitoring of success.

No additional mitigation measures are suggested beyond a SWPPP, soil reclamation and revegetation plans, and those mitigation measures discussed in Chapter 2.

4.5.10 Residual Impacts

No residual impacts to topographic or geologic resources are anticipated under any of the action alternatives. Residual impacts to soils outside of the permanent Parkway and graded shoulders are not anticipated.

4.5.11 Short-term Uses versus Long-term Productivity

Under all alternatives, there would be no short-term or long-term impacts to productivity of topographic or geological resources, except that geological resources would be precluded from access in the 250-foot-wide ROW during construction and during operation.

Short-term productivity of soils would be affected in the 250-foot-wide construction ROW during construction, as the soils would be temporarily disturbed, graded, and compacted. However, a reclamation and revegetation plan would be implemented for areas outside of the operational ROW, resulting in long-term impacts to soil productivity to only the operational ROW, due to pavement and shoulders precluding access to soils for grazing, wildlife habitat, and agriculture.

4.5.12 Irreversible and Irretrievable Commitment of Resources

There would be no irreversible and irretrievable commitment of topographic and geological resources under any of the action alternatives.

There would be irreversible commitments to soils, because these areas are not expected to ever be reclaimed and revegetated; thus long-term productivity of soils will be negatively impacted. Soil within the footprint of the paved Parkway and graded shoulders, the area previously described as permanent impacts, would be irreversibly committed following construction of the SVPP (Table 4-12).

Table 4-12. Irreversibly and Irretrievably Committed Soil Resources, by Alternative and Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Alternative A	83.6	167.1	220.1
Alternative C	96.5	193.1	254.5
Alternative H	97.5	195.1	391.5
Sub-alternative F	17.0	34.1	96.8
Sub-alternative G	12.7	25.3	72.0

4.6 VEGETATION RESOURCES

4.6.1 Analysis Area, Approach and Assumptions

This section describes the impacts of the Proposed Action and alternatives, as described in Chapter 2, on vegetation communities, special-status plant species, including federally and State-protected species, and invasive and noxious weeds. Four federal regulations pertain to vegetation resources in and adjacent to the project area: 1) those plant species listed under the ESA by the USFWS; 2) those plant species listed as sensitive by the BLM under BLM Manual Section 6840; 3) EO 13112 of February 3, 1999–Invasive Species; and 4) the Plant Protection Act. In addition, there are two sets of Arizona State regulations pertinent to the plant species addressed in this section: 1) State of Arizona laws addressing the control and eradication of noxious weeds (AAC R3-4-244 and R3-4-245); and 2) Arizona Native Plant Law (AAC R3-3-1101 through R 3-3-1111; and ARS 3-901 through 3-916). These regulations are described in Sections 1.5 and 3.6.1.

The analysis area for assessing potential direct and indirect impacts to vegetation resources is defined as the actual footprint of the project area, i.e., portions of the 250-foot-wide ROW plus the perimeter areas where noxious and invasive species could establish and/or where water resources could be affected. Impact determinations were based on calculations of disturbance acreage to vegetation types, including Lower Colorado River Valley Sonoran Desertscrub and xeroriparian as associated with habitat for species or to the vegetation community. These calculations included a GIS exercise to calculate polygons of upland desert areas that equated to Lower Colorado River Valley Sonoran Desertscrub and a 5-foot buffer along washes minus the sandy wash bottom to equate to xeroriparian vegetation. Impact indicators were assigned based mainly on the assumption that vegetation removal would be considered a long-term impact since desert vegetation does not recover rapidly, and that the impact would be negligible or minor since Lower Colorado River Valley Sonoran Desertscrub and xeroriparian vegetation types are common throughout central Arizona. Alternative comparisons were based on the relative acreage of impacts to each vegetation resource. Cumulative impacts to vegetation resources were analyzed in the Rainbow Valley area of analysis, as discussed in Section 4.6.9. The assumptions utilized in the analysis of impacts to vegetation resources include 1) that the "Applicant-Committed Environmental Protection Measures" as described in Section 2.5 will be followed; 2) that the vegetation in the proposed disturbance area will be removed during the initial construction phases; 3) that the design, construction, and operation activities would adhere to the specifications as outlined in Chapter 2; 4) that noxious and invasive plant species could colonize the perimeter areas from existing seed banks or from the introduction of propagules into the area; 5) that surface water flow throughout the area will only be minimally affected (see Section 4.8 Water Resources); and 6) the area where xeroriparian vegetation is located is equal to the associated floodplain of ephemeral washes in the project area. Thus, the approach for the analysis of impacts to vegetation resources in this section encompasses all of these considerations.

4.6.2 No Action

Under the No Action alternative, the SVPP would not be developed and existing land uses in the project area would continue. Management of vegetation would continue at the discretion of BLM management under the Lower Sonoran RMP. BLM's framework for a program of multiple use and sustained yield would continue within the project area. The maintenance of environmental quality of public lands (43 USC 1781[b]) in conformance with applicable statutes, regulations, and the Lower Sonoran RMP would continue. Current land uses in the area of analysis would continue under the No Action alternative, and the project area would be available to other uses that are consistent with the Lower Sonoran RMP.

Much of the project area is vacant land. Land in the immediate vicinity of the project area and alternatives would remain primarily open desert under the No Action alternative. As discussed in Section 3.11, current land uses in the area of analysis include dispersed outdoor recreation, agriculture, grazing, utilities, and transportation. Livestock grazing in the project area would continue in two allotments, which is already impacting vegetation resources. Vehicle use of the existing dirt roads in and near the project area and the associated impacts to individual plants from fugitive dust would continue to occur as a result of vehicle use. Limited recreational foot traffic would presumably also continue at low levels. No acres of vegetation communities would be disturbed beyond any currently existing surface-disturbing activities. There would be no impacts to special-status plant species beyond any impacts associated with the existing conditions identified in Chapter 3. There would be no impacts to noxious and invasive plant species beyond any impacts associated with the existing conditions identified in Chapter 3, and there would be no project perimeter and/or construction disturbances to increase the likelihood of invasion by noxious and invasive plant species.

4.6.3 Impacts Common to All Action Alternatives

The analysis of effects to vegetation resources is divided into three categories for further clarification: 1) vegetation community types, 2) special-status plant species, and 3) noxious and invasive species.

4.6.3.1 Two-lane Parkway

Vegetation Communities

The implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway would result in a site-specific, negligible, long-term direct impact to vegetation communities due to temporary and permanent vegetation removal, including of Lower Colorado River Valley Sonoran Desertscrub and xeroriparian vegetation community types.

Special-Status Plant Species

The only special-status plants species with the potential to occur within the project area are those listed under the ANPL, including but not limited to species such as blue paloverde, barrel cactus, velvet mesquite, desert ironwood, and crucifixion thorn. The project area contains habitat and individuals of ANPL-protected plant species. Thus, the implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway would result in a site-specific, negligible, long-term direct impact to ANPL-protected plant species due to temporary and permanent vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway could result in site-specific, minor, long-term, direct and indirect impact to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment. This impact could modify the existing vegetation communities by altering the vegetative composition and also by the potential increased risk of wildfire due to non-native species accumulation of fuel load. Because the rate of seed production and seed dispersal (i.e., the likelihood of introduction) differs for each particular noxious and invasive species, it is difficult to define the exact area that would be affected; thus, this impact is quantified as the ROW perimeter.

4.6.3.2 Four-lane Parkway

Vegetation Communities

The implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway would result in a site-specific, negligible, long-term direct impact to vegetation communities due to temporary and permanent vegetation removal, including of Lower Colorado River Valley Sonoran Desertscrub and xeroriparian vegetation community types.

Special-Status Plant Species

The only special-status plants species with the potential to occur within the project area are those listed under the ANPL, including but not limited to species such as blue paloverde, barrel cactus, velvet mesquite, desert ironwood, and crucifixion thorn; thus, the project area contains habitat and individuals of ANPL-protected plant species. Thus, the implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway would result in a site-specific, negligible, long-term direct impact to ANPL-protected plant species due to temporary and permanent vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway could result in a site-specific, minor, long-term, direct and indirect impact to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment. This impact could modify the existing vegetation communities by altering the vegetative composition and also by the potential increased risk of wildfire due to non-native species accumulation of fuel load. Because the rate of seed production and seed dispersal (i.e., the likelihood of introduction) differs for each particular noxious and invasive species, it is difficult to define the exact area that would be affected; thus, this impact is quantified as the ROW perimeter.

4.6.3.3 Six-lane Parkway

Vegetation Communities

The implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway would result in a site-specific, negligible, long-term direct impact to vegetation communities due to temporary and permanent vegetation removal, including of Lower Colorado River Valley Sonoran Desertscrub and xeroriparian vegetation community types.

Special-Status Plant Species

The only special-status plants species with the potential to occur within the project area are those listed under the ANPL, including but not limited to species such as blue paloverde, barrel cactus, velvet mesquite, desert ironwood, and crucifixion thorn; thus, the project area contains habitat and individuals of ANPL-protected plant species. Thus, the implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway would result in a site-specific, negligible, long-term direct impact to ANPL-protected plant species due to temporary and permanent vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway could result in a site-specific, minor, long-term, direct and indirect impact to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment. This impact could modify the existing vegetation communities by altering the vegetative composition and also by the potential increased risk of wildfire due to non-native species accumulation of fuel load. Because the rate of seed production and seed dispersal (i.e., the likelihood of introduction) differs for each particular noxious and invasive species, it is difficult to define the exact area that would be affected; thus, this impact is quantified as the ROW perimeter.

4.6.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.6.4.1 Two-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative A, the BLM Preferred Alternative, as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the Impacts Common to all Action Alternatives (Section 4.6.3 above); however, the impact would include 178.3 acres of vegetation removal, including 175.8 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.5 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative A as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 178.3 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative A as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 178.5-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.4.2 Four-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative A, the BLM Preferred Alternative, as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 421.2 acres of vegetation removal, including 415.3 acres of Lower Colorado River Valley Sonoran Desertscrub and 5.9 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative A as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 421.2 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative A as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 421.6-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.4.3 Six-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative A, the BLM Preferred Alternative, as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 474.3 acres of vegetation removal, including 467.6 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.7 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative A as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 474.3 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of

Alternative A as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 474.8-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action alternative, but the same for all other alternatives and phases.

4.6.5 Alternative C Direct and Indirect Impacts

4.6.5.1 Two-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative C as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 205.4 acres of vegetation removal, including 2.4 acres of Lower Colorado River Valley Sonoran Desertscrub and 203.0 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative C as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 205.4 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative C as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 206.3-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action alternative, but the same for all other alternatives and phases.

4.6.5.2 Four-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative C as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 485.1 acres of vegetation removal, including 479.5 acres of Lower Colorado River Valley Sonoran Desertscrub and 5.6 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative C as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in

Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 485.1 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative C as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 487.1-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.5.3 Six-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative C as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 546.1 acres of vegetation removal, including 539.7 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.4 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative C as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 546.1 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative C as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 548.5-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.6 Alternative H Direct and Indirect Impacts

4.6.6.1 Two-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative H as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 207.3 acres of

vegetation removal, including 205.0 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.3 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative H as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 207.3 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative H as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 208.3-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.6.2 Four-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative H as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 488.3 acres of vegetation removal, including 481.0 acres of Lower Colorado River Valley Sonoran Desertscrub and 7.3 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative H as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 488.3 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative H as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 491.9-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.6.3 Six-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative H as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 550.0 acres of vegetation removal, including 541.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 8.1 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative H as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 550.0 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative H as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 553.9-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.7 Sub-alternative F Direct and Indirect Impacts

4.6.7.1 Two-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Sub-alternative F as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 36.3 acres of vegetation removal, including 35.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 0.4 acre of xeroriparian vegetation community types. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 214.6 acres of vegetation removal, including 211.7 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.9 acres of xeroriparian vegetation community types if Alternative A is selected; a total impact of 241.7 acres of vegetation removal, including 238.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.8 acres of xeroriparian vegetation community types if Alternative C is selected; or a total impact of 243.6 acres of vegetation removal, including 240.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.7 acres of xeroriparian vegetation community types if Alternative H is selected.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Sub-alternative F as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 36.3 acres of vegetation removal, which could affect individuals and/or their habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 214.6 acres of vegetation removal if Alternative A is selected; a total impact of 241.7 acres of vegetation removal if Alternative C is selected; or a total impact of 443.6 acres of vegetation removal if Alternative H is selected, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Sub-alternative F as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), however, the impact is quantified as the 36.4-acre ROW perimeter. In addition, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total quantified impact to the 214.9-acre ROW perimeter if Alternative A is selected; a total quantified impact to the 242.6-acre ROW perimeter if Alternative C is selected; or a total quantified impact to the 244.7-acre ROW perimeter, if Alternative H is selected.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.7.2 Four-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Sub-alternative F as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 85.6 acres of vegetation removal, including 84.7 acres of Lower Colorado River Valley Sonoran Desertscrub and 0.9 acre of xeroriparian vegetation community types. However, since this is a sub-alternative, Alternative A or C would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 506.8 acres of vegetation removal, including 500.0 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.8 acres of xeroriparian vegetation community types if Alternative A is selected; a total impact of 570.7 acres of vegetation removal, including 564.2 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.5 acres of xeroriparian vegetation community types if Alternative C is selected; or a total impact of 574.0 acres of vegetation removal, including 565.7 acres of Lower Colorado River Valley Sonoran Desertscrub and 8.3 acres of xeroriparian vegetation community types if Alternative H is selected.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Sub-alternative F as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), however, the impact would include 85.6 acres of vegetation removal, which could affect individuals and/or their habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F;

thus, the impacts would be combined for a total impact of 506.8 acres of vegetation removal if Alternative A is selected; a total impact of 570.7 acres of vegetation removal if Alternative C is selected; or a total impact of 574.0 acres of vegetation removal if Alternative H is selected, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Sub-alternative F as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 85.9-acre ROW perimeter. In addition, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total quantified impact to the 507.5-acre ROW perimeter if Alternative A is selected; a total quantified impact to the 573.0-acre ROW perimeter if Alternative C is selected; or a total quantified impact to the 577.8-acre ROW perimeter, if Alternative H is selected.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.7.3 Six-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Sub-alternative F as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 96.4 acres of vegetation removal, including 95.4 acres of Lower Colorado River Valley Sonoran Desertscrub and 1.0 acre of xeroriparian vegetation community types. However, since this is a sub-alternative, Alternative A or C would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 570.7 acres of vegetation removal, including 563.0 acres of Lower Colorado River Valley Sonoran Desertscrub and 7.7 acres of xeroriparian vegetation community types if Alternative A is selected; a total impact of 642.6 acres of vegetation removal, including 635.1 acres of Lower Colorado River Valley Sonoran Desertscrub and 7.4 acres of xeroriparian vegetation community types if Alternative C is selected; or a total impact of 646.4 acres of vegetation removal, including 637.3 acres of Lower Colorado River Valley Sonoran Desertscrub and 9.1 acres of xeroriparian vegetation community types if Alternative H is selected.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Sub-alternative F as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 96.4 acres of vegetation removal, which could affect individuals and/or their habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 570.7 acres of vegetation removal if Alternative A is selected; a total impact of 642.6 acres of vegetation removal if Alternative C is selected; or a total impact of 646.4 acres of vegetation removal if Alternative H is selected, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Sub-alternative F as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 96.8-acre ROW perimeter. In addition, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total quantified impact to the 571.5-acre ROW perimeter if Alternative A is selected; a total quantified impact to the 645.3-acre ROW perimeter if Alternative C is selected; or a total quantified impact to the 650.7-acre ROW perimeter, if Alternative H is selected.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.6.8.1 Two-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Sub-alternative G, the BLM Preferred Sub-alternative, as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 27.0 acres of vegetation removal, including 26.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 0.1 acre of xeroriparian vegetation community types. However, since this is a sub-alternative, Alternative A or C would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 205.4 acres of vegetation removal, including 202.8 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.6 acres of xeroriparian vegetation community types if Alternative A is selected; a total impact of 232.4 acres of vegetation removal, including 229.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.5 acres of xeroriparian vegetation community types if Alternative C is selected; or a total impact of 234.3 acres of vegetation removal, including 232.0 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.4 acres of xeroriparian vegetation community types if Alternative H is selected.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Sub-alternative G as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 27.0 acres of vegetation removal, which could affect individuals and/or their habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 205.4 acres of vegetation removal if Alternative A is selected; a total impact of 232.4 acres of vegetation removal if Alternative C is selected; or a total impact of 234.3 acres of vegetation removal if Alternative H is selected, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Sub-alternative G as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 27.1-acre ROW perimeter. In addition, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total quantified impact to the 205.6-acre ROW perimeter if Alternative A is selected; a total quantified impact to the 233.3-acre ROW perimeter if Alternative C is selected; or a total quantified impact to the 235.3-acre ROW perimeter, if Alternative H is selected.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.8.2 Four-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Sub-alternative G, the BLM Preferred Sub-alternative, as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 63.8 acres of vegetation removal, including 63.3 acres of Lower Colorado River Valley Sonoran Desertscrub and 0.5 acre of xeroriparian vegetation community types. However, since this is a sub-alternative, Alternative A or C would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 484.9 acres of vegetation removal, including 478.6 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.3 acres of xeroriparian vegetation community types if Alternative A is selected; a total impact of 548.9 acres of vegetation removal, including 478.6 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.3 acres of xeroriparian vegetation community types if Alternative C is selected; or a total impact of 552.1 acres of vegetation removal, including 544.3 acres of Lower Colorado River Valley Sonoran Desertscrub and 7.8 acres of xeroriparian vegetation community types if Alternative H is selected.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Sub-alternative G as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 63.8 acres of vegetation removal, which could affect individuals and/or their habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 484.9 acres of vegetation removal if Alternative A is selected; a total impact of 548.9 acres of vegetation removal if Alternative C is selected; or a total impact of 552.1 acres of vegetation removal if Alternative H is selected, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Sub-alternative G as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 64-acre ROW perimeter. In addition, since this is a sub-alternative, Alternative A, C,

or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total quantified impact to the 485.5-acre ROW perimeter if Alternative A is selected; a total quantified impact to the 551.0-acre ROW perimeter if Alternative C is selected; or a total quantified impact to the 555.8-acre ROW perimeter, if Alternative H is selected.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.8.3 Six-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Sub-alternative G as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 71.8 acres of vegetation removal, including 71.3 acres of Lower Colorado River Valley Sonoran Desertscrub and 0.6 acre of xeroriparian vegetation community types. However, since this is a sub-alternative, Alternative A or C would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 546.1 acres of vegetation removal, including 538.8 acres of Lower Colorado River Valley Sonoran Desertscrub and 7.2 acres of xeroriparian vegetation community types if Alternative A is selected; a total impact of 548.9 acres of vegetation removal, including 542.8 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.1 acres of xeroriparian vegetation community types if Alternative C is selected; or a total impact of 621.8 acres of vegetation removal, including 613.2 acres of Lower Colorado River Valley Sonoran Desertscrub and 8.7 acres of xeroriparian vegetation community types if Alternative H is selected.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Sub-alternative G as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 71.8 acres of vegetation removal, which could affect individuals and/or their habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 546.1 acres of vegetation removal if Alternative A is selected; a total impact of 618.0 acres of vegetation removal if Alternative C is selected; or a total impact of 621.8 acres of vegetation removal if Alternative H is selected, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Sub-alternative G as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 72.0-acre ROW perimeter. In addition, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total quantified impact to the 546.8-acre ROW perimeter if Alternative A is selected; a total quantified impact to the 620.5-acre ROW perimeter if Alternative C is selected; or a total quantified impact to the 625.9-acre ROW perimeter, if Alternative H is selected.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.9 Additional Mitigation Measures

Due to the comprehensiveness of the design and construction specifications as described in Chapter 2, only two additional mitigation measures are proposed for the SVPP to minimize impacts to vegetation resources.

- All earth-moving equipment, hauling equipment, and other machinery will be inspected and washed with compressed air to remove any attached seeds, roots and rhizomes, and soil or other debris prior to entering or leaving the construction site.
- Verify that any soils or other materials imported for fill or restoration activities are certified as free of noxious and invasive plant species.

4.6.10 Residual Impacts

No residual impacts to vegetation resources are anticipated because impacts from the long-term disturbance and removal of vegetation communities, as discussed in the previous sections, would remain and cannot be mitigated any further.

4.6.11 Short-term Uses versus Long-term Productivity

Since the paved road bed surface will remain for an indeterminate amount of time in the future and these areas are not expected to ever be reclaimed and revegetated, long-term productivity of vegetation resources will be negatively impacted. In addition, those areas that are reclaimed will have a lag in return to full productivity given that desert ecosystems can take up to 50 years to return to pre-disturbance conditions (Guo 2004; Kade and Warren 2002). Lastly, native plants that are salvaged and replanted often do not survive or go into “shock” and take many years to establish in the new area and return to full productivity and pre-disturbance conditions (Bainbridge 2007).

4.6.12 Irreversible and Irretrievable Commitment of Resources

Irreversible commitment of resources would be limited to the paved road bed surface, since it will remain for an indeterminate amount of time in the future and these areas are not expected to ever be reclaimed and revegetated. Implementation of any of the action alternatives would result in the irreversible and irretrievable loss of between 178.5 and 625.9 acres of vegetative habitat.

4.7 VISUAL RESOURCES

For visual resources, the BLM manages landscapes that require varying levels of protection and modification, giving consideration to the uses and values of other resources and the scenic quality of the landscape. This visual resource analysis identifies the potential project impacts to the physical environment through an evaluation of visual contrast and viewer sensitivity.

Impacts for visual resources are described in terms of negligible (no known impacts to resources); minor (direct effects are apparent and measurable but small and localized or contained within the footprint of the action); moderate (direct effects would be readily apparent and measurable over a larger area but still mainly within the footprint of the action); and major (direct effects would be highly noticeable and extend well beyond the footprint of the action).

4.7.1 Analysis Area, Approach and Assumptions

The analysis area for the visual resources analysis is a 10-mile buffer around all the project alternatives (project area). The project area refers to the actual physical boundaries of the proposed SVPP alignments.

The visual resource impacts analysis is an assessment of landscape changes that would result from the construction and operation of SVPP under the action alternatives. Because changes to the characteristic landscape in the analysis area would be the primary direct impact of SVPP on visual resources, the relative impacts of each alternative to the characteristic landscape were assessed by comparing visual contrasts that would result from changes to the form, line, texture, and color of the existing environment directly resulting from the construction and operation of the SVPP. The area of analysis for visual resources is the extent from where the project would be visible—i.e., the viewshed (which is located roughly within a 10-mile radius of the action alternatives and slightly further when viewed from higher elevations). The Rainbow Valley roughly represents the region in which existing visual resources, when assessed in combination with the project and other cumulative actions, would be impacted if the SVPP were implemented.

The analysis also consists of an assessment of visual contrast resulting from those same actions as seen from five critical viewpoints, or key observation points (KOPs). For the SVPP, viewpoints selected were critical views of typical landscapes that were selected to represent the views of disturbances of the SVPP and that would be encountered by the greatest number of people, for the greatest viewing duration. Because the SVPP is proposed, in part, on BLM-managed land, the analysis also consists of an assessment of whether the proposed changes to the landscape would meet the BLM's objectives for management of visual resources, as prescribed in the Lower Sonoran RMP (BLM 2012a). Table 4-13 shows the total VRM classification acreage of each action alternative as well as acreage for State Trust land and private land. All BLM lands crossed by the action alternatives are located on VRM Class IV landscape.

Table 4-13. Land Use and VRM Classifications by Action Alternative (acres)

Alternative	VRM Class I	VRM Class II	VRM Class III	VRM Class IV	State Trust Land	Private Land
Alternative A (BLM Preferred Alternative)	0	0	0	284.4	32.4	157.8
Alternative C	0	0	0	314.3	57.1	172.0
Alternative H	0	0	0	242.3	74.3	171.5
Sub-alternative F	0	0	0	0.0	0	94.7
Sub-alternative G (BLM Preferred Sub-alternative)	0	0	0	0.0	0	72

The SDNM (located approximately 800 feet west/south of the Preferred Alternative [Alternative A]) is classified as Class III, II, and I. Areas of the SDNM immediately adjacent to the Preferred Alternative proposed ROW are classified as Class III. Privately owned land and State Trust Land remains unclassified in terms of BLM VRM.

4.7.2 No Action

Implementation of the No Action Alternative would result in no construction and operation associated with the SVPP, and therefore would result in no physical changes to the existing landscape. No change to the views currently experienced at each of the viewpoints described below in Section 4.7.4.3, Key Observation Points, and shown on Figure 3-10 is expected related to this project under the No Action Alternative.

The current landscape in the Rainbow Valley is characterized by flat to low desert hills and plains with low vegetative diversity typical of creosote flats. Existing human modifications in the project area are limited to dirt surface tracks and roads, utility features (e.g., transmission lines and pipelines), cultivated agriculture fields, and two abandoned stock ponds. Under the No Action Alternative, the landscape would continue to be influenced by these factors, and would meet the BLM's objectives for management of VRM Class IV.

4.7.3 Impacts Common to all Action Alternatives

Adding a Parkway to the landscape in Rainbow Valley would result in an alteration of the existing landscape. In the short-term, construction of SVPP would cause dust to be emitted from earthmoving activities, construction vehicles and equipment, construction worker vehicles, materials delivery vehicles, and from areas within the construction zone that have been disturbed or where excavation material is stockpiled. Fugitive dust, if emitted in sufficient quantities, and if adverse weather conditions persist, could impact or degrade existing views in the short term. However, fugitive dust would not result in permanent changes to the existing landscape.

Regardless of the alternative implemented, the SVPP would be visible from selected KOPs in the Rainbow Valley (see Figure 3-10 for SVPP KOP locations). In addition, for any of the alternatives selected, contrasts to the existing views in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. The Parkway design would be the same for each action alternative (aside from the actual road alignment, location of wildlife crossings, and drainage crossings which are dependent upon geographic location of the Parkway). Signage, curb and gutter, slope and gradient would be the same for each alternative, and mitigation measures employed would also be the same (further described in Section 4.7.9, Additional Mitigation Measures). The surface of the SVPP would have an even, fine and smooth texture when viewed both near and from afar. The project's scale and purpose during operation would be the same for each alternative. Visual contrast ratings were completed for each of the five KOPs and are provided in Appendix I (SWCA 2009b).

4.7.3.1 SDNM/North Maricopa Mountains Wilderness: KOP 1

Under all action alternatives, the Parkway would be scarcely visible in the foreground/middle ground from this KOP. The view towards the project area from this KOP is a level view, and is approximately 5 miles west of the SVPP. BLM Road 8000C penetrates SDNM near the northern end of the project area, and topographic screening obscures SVPP from coming into full view at this KOP (Figure 4-1). Travelers on this road would likely have high expectations for scenic quality (natural or undeveloped landscapes). The introduction of the SVPP into the landscape would result in contrasts to line due to the sharp edges of the Parkway, and the interruption of the expansive, panoramic landscape which currently has no views of similar facilities. Additionally, the SVPP would result in a band of contrasting color changing the current earth tones of browns, tans, and greens, to colors associated with built Parkway such as black/gray asphalt. In general, contrast resulting from the texture change of the SVPP in the landscape would result in the evidence of a straight, linear paved feature. SVPP would present weak visible contrasts to the

Figure 4-1. View from KOP 1, facing east from within SDNM toward the proposed SVPP.

existing landscape when observed from this KOP because of topographic and vegetative obstruction combined with the low-lying linear nature of the Parkway itself. A weak visual impact would correspond with BLM VRM Class IV designation.

4.7.3.2 House/Residence: KOP 2

Under all action alternative alignments, the Parkway would be visible in the middle ground from this KOP. The view towards the project area from this KOP is a level view. The residents at this KOP would have level views of the SVPP because of the flat, open expanse of land in this area (Figure 4-2). Views from this KOP of the proposed Parkway would only reveal 4 miles of the entire stretch of Parkway, and the absence of an elevated view would partially to almost completely screen most of the alignment from residents at this KOP. Areas of the SVPP that may be slightly elevated (culverts and bridges) in addition to other human-made modifications (unrelated to the Parkway) would be slightly more visible than the at-grade Parkway itself from this KOP. The regular geometric form and line associated with roads would result in a weak contrast with the irregular and organic forms (as well as existing regular and synthetic conditions) of the existing landforms and vegetation. A weak visual impact would correspond with BLM VRM Class IV designation.

4.7.3.3 Sierra Estrella Wilderness–Quartz Peak: KOP 3

The Quartz Peak summit would be approximately 10 to 12 miles from the action alternative alignments and would have superior views of the SVPP in the background distance zone (Figure 4-3). The entire SVPP would be visible from this KOP. However, from this distance, the geometric patterns would mimic the existing modifications associated with agricultural fields and other existing non-paved roads. The construction footprint followed by paving of the SVPP creates the greatest contrast to the surrounding landscape and therefore would result in a weak visual impact based upon distance and degree of contrast. A weak visual impact would correspond with BLM VRM Class IV designation.

Figure 4-2. View from KOP 2, facing southwest toward the proposed SVPP.

Figure 4-3. View from KOP 3, facing west toward the SDNM and proposed SVPP.

4.7.3.4 Town of Mobile: KOP 4

The SVPP would be visible from a level viewing position in the foreground distance zone approximately 0.5 mile from the southern terminus of the SVPP (Figure 4-4). Viewers at this KOP would likely not have a high expectation for scenic quality since existing development exists at this KOP, as well as the landfill

Figure 4-4. View from KOP 4, facing north toward the proposed SVPP.

being within view of this KOP. The SVPP would present a minimal and weak degree of visual contrasts to the existing landscape when observed from KOP 4 apart from those discussed in Section 4.7.3, Impacts Common to All Action Alternatives. Visual impacts from KOP 4 in the community of Mobile would be weak which would correspond with BLM VRM Class IV designation.

4.7.3.5 Juan Bautista de Anza National Historic Trail: KOP 5

This KOP was designated due to the relatively high number of tourists that travel the route once used by Spanish explorer Juan Bautista de Anza—the Juan Bautista de Anza National Historic Trail that travels along this portion of SR 238. The SVPP would not be visible from a level viewing position in the foreground and middle ground distance zone from KOP 5, which is located approximately 4.5 miles from the southern terminus of the SVPP (Figure 4-5). The SVPP, located in the middle ground and background, would be nearly completely screened by topography, vegetation, and the landfill. Visual impacts from KOP 5 would be weak and would correspond with BLM VRM Class IV designation.

4.7.3.6 Two-lane Parkway

Changes to the landscape caused by the construction and operation of the two-lane Parkway would create visual contrasts to line, color, and texture in an area where no or limited similar development exists. The profile of the Parkway would create mostly horizontal/linear changes to the viewshed and the movement of vehicles during operation would be evident from foreground and middle ground distances, but would be difficult to discern from background distances (8 miles and beyond). Changes to the landscape for all action alternatives would be long-term, moderate (due to the addition of a human-made feature where there currently there is none), and largely local (limited to within a 10-mile radius, or viewshed).

Figure 4-5. View from KOP 5, facing north toward the proposed SVPP.

4.7.3.7 Four-lane Parkway

Changes to the landscape caused by the construction and operation of the four-lane Parkway would be similar to those created by the two-lane scenario except that the addition of four lanes would support additional vehicular traffic which could be seen from foreground and middle ground distances.

The profile of the Parkway would create mostly horizontal/linear changes to the viewshed and the four-lane scenario would include a 112-foot-wide median. The expanded area of visual contrast would be evident from middle ground and foreground distances but due to topography, vegetation, and other visual disturbances, long distance views (over 5 miles away) would be largely obstructed. Changes to the landscape for all action alternatives would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed).

4.7.3.8 Six-lane Parkway

Changes to the landscape caused by the construction and operation of the six-lane Parkway would be similar to those created by the four-lane scenario except that the addition of six lanes would support additional vehicular traffic which could be seen from foreground and middle ground distances.
The profile of the Parkway would create horizontal/linear changes to the viewshed and the six-lane scenario would include an 84-foot-wide median. The expanded area of visual contrast would be evident from middle ground and foreground distances but due to topography, vegetation, and other visual disturbances, long distance views (over 5 miles away) would be largely obstructed. Changes to the landscape for all action alternatives would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed). Variation of acres of disturbance for visual impacts would increase incrementally for each of the two-, four-, and six-lane scenarios, however the maximum acreage (or six-lane scenario) of visual impact for each action alternative is reported in Table 4-13.

4.7.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

Alternative A, the BLM Preferred Alternative, follows the boundary of the SDNM along an unimproved EPNG pipeline road. The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from viewpoints within the SDNM to the west. Alternative A would be visible from all KOPs in the Rainbow Valley to varying degrees (see Figure 3-10 for SVPP KOP locations) and visual contrast to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. Likewise, the level of change to the characteristic landscape would be in keeping with the established VRM Class IV objectives for the 284.6 acres of BLM land within the project area (see Table 4-12 and Figure 3-9 VRM Classes).

4.7.4.1 Visual Resource Management

VRM objectives for public lands on which Alternative A is located are Class IV (see Table 4-12). Under the BLM VRM program, the objective of Class IV is to provide for management activities that require major modifications to the existing character of the landscape. These activities may dominate the view and may be the major focus of viewer attention (BLM 1986b). The level of change to the characteristic landscape that would result from implementation of Alternative A is consistent with the objectives of VRM Class IV.

4.7.4.2 Visual Conditions

Under Alterative A, the SVPP would be largely constructed within the existing EPNG multi-use utility corridor, adjacent to an unpaved pipeline access road, existing 500-kV transmission line, and Komatke Road.

The complexity of SVPP construction would be a simple line with a “sharp” edge, and evident line, color, and texture contrast, when viewed from the surrounding mountaintops, but would have irregular texture and lines when viewed from nearby. The construction ROW would be 250 feet wide. The color of the SVPP would be the same at all times of the day; however, depending upon the viewing angle and time of day, the SVPP’s dull hues of Parkway and asphalt features may shift to a lighter hue when increased light shines down at various angles. During construction, the hue would primarily be a light brown and tan, characteristic of road construction, surface-soil grading, and leveling of the project area. Construction of the SVPP would have a coarse and random distribution texture, depending on the pattern of construction activities. This would be similar for both near and distant visual conditions.

Alternative A, as opposed to the other action alternatives presented, represents the alignment with the fewest turns and curves. When observed from a higher elevation, Alternative A will create a continuous contrasting linear form dividing the Rainbow Valley from SDNM. However, the contrast of SVPP would be weak when compared to the bold and complex forms of mountainous and desert landscapes that surround the project area. Similarly, other existing roads near the project area, such as Riggs Road and SR 238, can be viewed in the same viewshed as the SVPP. Since construction requires greater ground disturbance and an increased footprint (wider ROW), impacts to visual resources would be greatest during construction.

Once construction is completed, vehicles traveling on the Parkway would create movement in the landscape. In addition, during operation of the SVPP, the browns and tans would be replaced by a darker, dull chroma characteristic of other roads in the region. The project will result in a “similar look” to other

paved, two-lane roads in the area, such as SR 238. The SVPP would be paved with asphalt over aggregate base, resulting in a dark-colored surface that would travel the Rainbow Valley from north to south for 15.7 miles, at a width of 44 feet.

The dominant features of Rainbow Valley discussed in Section 3.7 would not be replaced by the SVPP as the primary dominating feature. The existing roads are not paved and are therefore a less-dominating contrast to the existing conditions than the SVPP. However, the characteristics of the landscape would shift slightly due to the introduction of a paved Parkway into a generally vacant landscape. The shift would be within the management objectives outlined in the Lower Sonoran RMP (BLM 2012a). Under Alternative A, the level of change to the characteristic landscape would range from weak to strong, based on the visual resource contrast analysis, and would meet BLM VRM Class IV objectives.

4.7.4.3 Key Observation Points

The closest viewpoint, and the viewpoint with the most unobstructed views, is from the community of Mobile (KOP 4) which lies less than 0.3 mile from the southern terminus (approximate last 2 miles) of the proposed Alternative A. Views from this KOP afford foreground/middle ground and background views of approximately 10.5 miles of Parkway. Human-made development obstructs portions of direct views of the proposed alternative, however the landscape is largely flat, panoramic, and sparsely vegetated, which affords ideal long-distance viewing conditions. The KOP located within the SDNM (KOP 1) has the least potential for views of Alternative A because of topographic and vegetative obstruction. Additionally, views of the road are within the middle ground to background distance zones, most of the proposed alternative would be obstructed from views from this KOP. KOP 2 (residence), KOP 3 (Sierra Estrella Wilderness), and KOP 5 (Juan Bautista de Anza NHT) would afford similar viewing conditions of Alternative A, which would be from middle ground and background distances. KOP 3 would afford a superior view (from an elevated location) which results in a panoramic view of the landscape, and though Alternative A would be in the background distance zone, nearly the entire road corridor would be in view from this angle of observation.

4.7.4.4 Two-lane Parkway

Visual impacts associated with the construction and operation of the two-lane Parkway would include the physical changes resulting from the addition of a 44-foot wide Parkway constructed in a 250-foot-wide ROW. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical parkway type and views would be of a paved linear transportation feature with bidirectional movement of vehicular traffic. A digital model depicting the proposed Parkway was rendered to illustrate the transportation facility as raised approximately 15 feet from ground level to simulate maximum elevated conditions. Changes to the landscape for the two-lane scenario would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed). Alternative A follows an existing unpaved roadway or “scar” in the landscape which largely minimizes surface disturbance as compared to the other action alternatives being considered. The proposed Parkway is not located on a steep, exposed slope, but rather is located along an existing disturbed corridor.

4.7.4.5 Four-lane Parkway

Visual impacts associated with the construction and operation of the four-lane Parkway would include the physical changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The four-lane scenario would have two lanes in each direction with graded shoulders and a 112-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical

parkway type and views would be of a paved linear transportation feature with four lanes of bidirectional movement of vehicular traffic. Because the four-lane Parkway accommodates more traffic than the two-lane scenario, the additional traffic would create a more obvious pattern of motion along the Parkway. Changes to the landscape for the four-lane scenario would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed). However, adding two additional through lanes to the ROW would result in a minor increase in visual impact. The phasing of construction of the four-lane Parkway scenario would be based on both traffic demand and available funding.

4.7.4.6 Six-lane Parkway

Visual impacts associated with the construction and operation of the six-lane Parkway would include the physical changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The six-lane scenario would have three lanes in each direction with graded shoulders and an 84-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical six-lane parkway type and views would be of a paved linear transportation feature with six lanes of bidirectional movement of vehicular traffic. Because the six-lane Parkway accommodates more traffic than the two- or four-lane scenarios, the additional traffic would create a more obvious pattern of motion along the Parkway. Changes to the landscape for the six-lane scenario would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed). Variation of acres of disturbance for visual impacts would increase incrementally for each of the two-, four-, and six-lane scenarios, however the maximum acreage (or six-lane scenario) of visual impact for each action alternative is reported in Table 4-12 as 284.4 acres. The addition of a six-lane Parkway, or build-out conditions, would increase the visual impact of the alternative within the landscape; however, at build-out the full vegetation plan and all mitigation measures would be realized and would reduce the visual size and contrast of the Parkway within the viewshed.

4.7.5 Alternative C Direct and Indirect Impacts

Alternative C follows a curvilinear route south on Rainbow Valley Road, east along Patterson Road and south to connect with the EPNG pipeline road. The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape, which would be visible from spots within the Rainbow Valley. Figure 3-10 indicates Alternative C would be visible from selected KOPs in the Rainbow Valley. Visual contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. Likewise, the level of change to the characteristic landscape would be in keeping with the established VRM Class IV objectives for the 314.3 acres of BLM land within the project area (see Table 4-12 and Figure 3-9 VRM Classes).

4.7.5.1 Visual Resource Management

Implementation of construction and operation activities associated with Alternative C would be consistent with BLM VRM objectives for the project area. This alternative traverses VRM Class IV landscape on BLM land which allows for major modifications. Alternative C also traverses private and State lands, which do not have visual management prescriptions. As compared to Alternative A, Alternative C is located between 3 and 6 miles from the KOP 1 (SDNM) which is the most highly sensitive viewing area. Alternative C may have slightly less of an adverse impact to the viewshed because of its distance from visually valued landscapes. However, the addition of Alternative C to the existing landscape would have

long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed) impacts.

4.7.5.2 Visual Conditions

The visual conditions of the SVPP under Alternative C would be similar to Alternative A. However, the complexity of SVPP construction for Alternative C would differ from Alternative A in that the Parkway is less simple due to sharp curves and turns. When observed from higher elevations, Alternative C will create a continuous contrasting linear form dividing the Rainbow Valley from SDNM. Though Alternative C is linear, the addition of Alternative C's curves and turns adds complexity to the geometric form of the landscape. The curvilinear nature of Alternative C in the Parkway alignment is more abrupt and appears to be more discordant with the existing topography than Alternative A; therefore Alternative C would have a higher level of visual contrasts to the landscape than Alternative A.

4.7.5.3 Key Observation Points

When observed from KOP 3, Sierra Estrella Mountains, Alternative C's curves and turns would add complexity to the geometric form of the landscape. This would result in an increased contrast to the existing landscape greater than that of Alternative A. However, aside from the curvilinear nature of the corridor adding to additional contrast within the landscape, Alternative C would largely be viewed similarly to Alternative A at each of the KOPs.

4.7.5.4 Two-lane Parkway

Visual impacts associated with the construction and operation of the two-lane Parkway for Alternative C would include the physical changes resulting from the addition of a 44-foot-wide Parkway constructed in a 250-foot-wide ROW. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical parkway type and views would be of a paved linear transportation feature with bidirectional movement of vehicular traffic. The alignment of Alternative C follows a curvilinear pathway which would result in more evident views of the Parkway in the areas of the curves and turns. Changes to the landscape for the two-lane scenario would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed).

4.7.5.5 Four-lane Parkway

Visual impacts associated with the construction and operation of the four-lane Parkway would include the physical changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The four-lane scenario would have two lanes in each direction with graded shoulders and a 112-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical parkway type and views would be of a paved linear transportation feature with four lanes of bidirectional movement of vehicular traffic. The alignment of Alternative C follows a curvilinear pathway which would result in more evident views of the Parkway in the areas of the curves and turns. Because the four-lane Parkway accommodates more traffic than the two-lane scenario, the additional traffic would create a more obvious pattern of motion along the Parkway. Changes to the landscape for the four-lane scenario would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed).

4.7.5.6 Six-lane Parkway

Visual impacts associated with the construction and operation of the six-lane Parkway would include the physical changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The six-lane scenario would have three lanes in each direction with graded shoulders and an 84-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical six-lane parkway type and views would be of a paved linear transportation feature with six lanes of bidirectional movement of vehicular traffic. The alignment of Alternative C follows a curvilinear pathway which would result in more evident views of the Parkway in the areas of the curves and turns. Because the six-lane Parkway accommodates more traffic than the two- and four-lane scenarios, the additional traffic would create a more obvious pattern of motion along the Parkway. Changes to the landscape for the six-lane scenario would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed). Variation of acres of disturbance for visual impacts would increase incrementally for each of the two-, four-, and six-lane scenarios, however the maximum acreage (or six-lane scenario) of visual impact for each action alternative is reported in Table 4-12 as 314.3 acres.

4.7.6 Alternative H Direct and Indirect Impacts

Alternative H is physically similar to Alternative C in that it follows a curvilinear route south on Rainbow Valley Road, east along Patterson Road and south on Bullard Avenue then diverges south and east through unimproved landscape to connect with the EPNG pipeline road to heads south through undeveloped land to its terminus at SR 238. The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from spots within the Rainbow Valley. Figure 3-10 indicates Alternative H would be visible from selected KOPs in the Rainbow Valley. Visual contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. Likewise, the level of change to the characteristic landscape would be in keeping with the established VRM Class IV objectives for the 242.3 acres of BLM land within the project area (see Table 4-12 and Figure 3-9 VRM Classes).

4.7.6.1 Visual Resource Management

Implementation of construction and operation activities associated with Alternative H would be consistent with BLM VRM objectives for the project area. This alternative traverses VRM Class IV landscape on BLM land which allows for major modifications. Alternative H also traverses private and State lands, which do not have visual management prescriptions. As compared to Alternative A, Alternative H is located between 3 and 16 miles from KOP 1 within the SDNM. Therefore, Alternative H may have slightly less of an adverse impact to the viewshed due to its distance from visually valued landscapes. However, the addition of Alternative H to the existing landscape would have long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed) impacts.

4.7.6.2 Visual Conditions

The visual conditions of the SVPP under Alternative H would be similar to Alternative C. However, the complexity of SVPP construction for Alternative H would differ from Alternative C in that the Parkway includes a series of sharp (90-degree) turns within a relatively short distance of one another. When observed from higher elevations, Alternative H would create a continuous contrasting linear form dividing the Rainbow Valley from SDNM. Though Alternative H is linear, the addition of Alternative H's

sharp curves and turns adds more complexity to the geometric form of the landscape than Alternative C. The curvilinear nature of Alternative H in the Parkway alignment is more abrupt and appears to be more discordant with the existing topography than Alternative C; therefore Alternative H would have a slightly higher level of visual contrast to the landscape than Alternative A or C. The addition of Alternative H to the existing landscape would have long-term, minor (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed) impacts.

4.7.6.3 Key Observation Points

The contrasts of Alternative H would be visible predominantly from KOP 2 (residence) and KOP 3 (Sierra Estrella Wilderness) and would be similar to those described under Alternative C. When observed from KOP 3, Alternative H's curves and turns would add complexity to the geometric form of the landscape. This would result in an increased contrast to the existing landscape greater than that of Alternative C.

4.7.6.4 Two-lane Parkway

Visual impacts from the two-lane Parkway scenario for Alternative H would be the same as for Alternative C.

4.7.6.5 Four-lane Parkway

Visual impacts from the four-lane Parkway scenario for Alternative H would be the same as for Alternative C.

4.7.6.6 Six-lane Parkway

Visual impacts from the six-lane Parkway scenario for Alternative H would be the same as for Alternative C. Variation of acres of disturbance for visual impacts would increase incrementally for each of the two-, four-, and six-lane scenarios, however the maximum acreage (or six-lane scenario) of visual impact for each action alternative is reported in Table 4-12 as 242.3 acres.

4.7.7 Sub-alternative F Direct and Indirect Impacts

Sub-alternative F, which traverses a total of 2.8 miles, begins at the EPNG pipeline road and follows a southeasterly route to connect with its terminus at SR 238. The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from viewpoints within the Rainbow Valley. Figure 3-10 indicates Sub-alternative F would be visible from three KOPs in the Rainbow Valley (i.e., the community of Mobile, Juan Bautista de Anza National Historic Trail, and Sierra Estrella's Quartz Peak). Visual contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. Sub-alternative F is located entirely outside of BLM lands.

4.7.7.1 Visual Resource Management

Sub-alternative F is located entirely on private lands, which do not have visual management prescriptions.

4.7.7.2 Visual Conditions

The visual conditions of the SVPP under Sub-alternative F is primarily along the EPNG pipeline road, an existing unpaved, bladed maintenance road that ends at SR 238 (with no formal intersection).

4.7.7.3 Key Observation Points

The contrasts of Sub-alternative F are most visible from the two southernmost KOPs (KOP 4—Mobile and KOP 5—Juan Bautista de Anza NHT). When observed from the southern end of the project area, the intersection with SR 238 would be evident.

4.7.7.4 Two-lane Parkway

Visual impacts associated with the construction and operation of the two-lane Parkway would include the visual changes resulting from the addition of a 44-foot-wide Parkway 2.8 miles in length, constructed in a 250-foot-wide ROW on the existing EPNG pipeline road alignment. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical parkway type and views would be of a paved linear transportation feature with bidirectional movement of vehicular traffic.

4.7.7.5 Four-lane Parkway

Visual impacts associated with the construction and operation of the four-lane Parkway would include the visual changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The four-lane scenario would have two lanes in each direction with graded shoulders and a 112-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical parkway type and views would be of a paved linear transportation feature with four lanes of bidirectional movement of vehicular traffic. Because the four-lane Parkway accommodates more traffic than the two-lane scenario, the additional traffic would create a more obvious pattern of motion along the Parkway.

4.7.7.6 Six-lane Parkway

Visual impacts associated with the construction and operation of the six-lane Parkway would include the visual changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The six-lane scenario would have three lanes in each direction with graded shoulders and an 84-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical six-lane parkway type and views would be of a paved linear transportation feature with six lanes of bidirectional movement of vehicular traffic. Because the six-lane Parkway accommodates more traffic than the two- and four-lane scenarios, the additional traffic would create a more obvious pattern of motion along the Parkway. Variation of acres of disturbance for visual impacts would increase incrementally for each of the two-, four-, and six-lane scenarios, however the maximum acreage (or six-lane scenario) of visual impact for each action alternative is reported in Table 4-12 as 2 acres.

4.7.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

Sub-alternative G, the BLM Preferred Sub-alternative, which traverses a total of 2.4 miles, begins at the EPNG pipeline road and follows a southeasterly route through vacant land to connect to the 107th Avenue

alignment and heads south with its terminus at SR 238. The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from viewpoints within the Rainbow Valley. Figure 3-10 indicates the visibility of Sub-alternative G would be evident from three KOPs in the Rainbow Valley (i.e., the community of Mobile, Juan Bautista de Anza National Historic Trail, and Sierra Estrella's Quartz Peak). Visual contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. Sub-alternative G is located entirely outside of BLM lands.

4.7.8.1 Visual Resource Management

Sub-alternative G is located entirely on private lands, which do not have visual management prescriptions.

4.7.8.2 Visual Conditions

The visual condition of SVPP for Sub-alternative G is primarily undeveloped, vacant desert scrub landscape that ends at SR 238 (with no formal intersection).

4.7.8.3 Key Observation Points

The visual contrasts of Sub-alternative G are most visible from the two southernmost KOPs. When observed from the southern end of the project area, the intersection with SR 238 would be evident.

4.7.8.4 Two-lane Parkway

Visual impacts associated with the construction and operation of the two-lane Parkway would include the physical changes resulting from the addition of a 44-foot-wide Parkway 2.4 miles in length, constructed in a 250-foot-wide ROW. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as typical parkway type and views would be of a paved linear transportation feature with bidirectional movement of vehicular traffic.

4.7.8.5 Four-lane Parkway

Visual impacts associated with the construction and operation of the four-lane Parkway would include the physical changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The four-lane scenario would have two lanes in each direction with graded shoulders and a 112-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical parkway type and views would be of a paved linear transportation feature with four lanes of bidirectional movement of vehicular traffic. Because the four-lane Parkway accommodates more traffic than the two-lane scenario, the additional traffic would create a more obvious pattern of motion along the Parkway.

4.7.8.6 Six-lane Parkway

Visual impacts associated with the construction and operation of the six-lane Parkway would include the physical changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The six-lane scenario would have three lanes in each direction with graded shoulders and an 84-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical six-lane parkway type and views would be of a paved linear transportation feature with six lanes of bidirectional movement of vehicular traffic. Because the six-lane Parkway accommodates more traffic

than the two- and four-lane scenarios, the additional traffic would create a more obvious pattern of motion along the Parkway.

4.7.9 Additional Mitigation Measures and Best Management Practices

BLM prescribes BMPs for linear and horizontal structures introduced into the landscape. The proposed Parkway would be designed in keeping with Arizona Parkway Design Standards and in addition, BLM BMPs for scenic quality would be integrated into the design and construction of the Parkway. Mitigation measures specific to the project and environment would also be employed to reduce visual disturbance.

Mitigation measures to reduce impacts on visual resources, where feasible, will include the use of tinted or painted concrete (used in culverts, bridge crossings, or sidewalks) muted in standard desert colors from the BLM Standard Color Chart, in hues of olive, tan, and browns, to blend with the surrounding environment, which would reduce the degree of contrast to the surrounding landscape.

Final design and landscaping has not been conducted at the time of this analysis, therefore it is assumed that a landscape plan, and design of other Parkway amenities (e.g., lights, pedestrian walks, curbing, etc.) will be part of the final engineering and design of this Parkway and would be in keeping with Arizona Standards for Parkway Design as published by Maricopa County and BLM BMPs. BLM would have the final decision on the tinting or use of painted colors that may be applied to culverts, bridge crossings, etc.

Ground disturbances outside the road bed, such as construction staging areas and shoulder work, would be top-soiled and revegetated with native vegetation.

Additional best management practices for visual design include:

- A reseeding plan that restores proper species composition, and native vegetation.
- Color treatment of signage along the Parkway to reduce and remove glare from standard stainless steel sign backing.
- Vertical concrete color treating of surfaces such as outside edges of concrete box culverts and wildlife crossings, wing walls stemming off of concrete culverts, and any other retaining walls and bridges.
- Design detail of the concrete box culverts and wildlife crossings should include wing walls that taper gradually with fill slope as the Parkway is elevated over the landscape.
- Guardrails, ROW fencing, and light poles should be CorTen self-weathering steel or should be treated with a weathering agent resulting in a similar visual effect to reduce the visual contrast of traditional galvanized metal guardrail.

In addition, ADOT has also published BMPs and native plan salvage and replanting guidance. According to ADOT BMPs, soil stabilization and vegetation control and management is encouraged on slopes and within the median, shoulder, and road ROW (ADOT 2008b). Construction of a Parkway includes the salvaging of native trees, shrubs, and cactus, and post-construction revegetation includes the application of grass seed and mulch through hydroseeding to prevent erosion. The native seed mixture is subject to the specific project and is typically included in the landscaping section of the construction plan. ADOT also requires conformance with Arizona Native Plant Laws, and the ADOT Native Plant Salvage and Replanting Evaluation guidance includes the replanting and resalvaging of plant material to restore wildlife habitat or connectivity between habitat areas crossing the Parkway. Revegetation techniques are also used to maintain and enhance the visual quality of the Parkway and ADOT guidance encourages

professional judgment to be used to achieve an appearance similar to the surrounding area while simultaneously using self-sustainable vegetation that can thrive with naturally occurring moisture (ADOT 2013).

4.7.10 Residual Impacts

The effectiveness of using standard desert colors for painted concrete would be limited by the distance of the KOP and the presence of other sources of contrast; therefore, impacts would generally be the same as the direct and indirect impacts described under each alternative. Regardless of the alternative selected, certain views during the construction period would be altered by the presence of construction vehicles, equipment personnel, and emerging new highway facilities. This impact is an unavoidable consequence of project construction.

4.7.11 Short-term Uses versus Long-term Productivity

Construction and operation of the SVPP would require short-term and long-term uses of land for transportation. Implementation of the SVPP under all action alternatives would create long-term and permanent disruptions of the characteristic landscape from soil and vegetation disturbances and would change the land use from a vacant setting to a transportation corridor.

4.7.12 Irreversible and Irretrievable Commitment of Resources

The visual contrasts that would result from construction and operation of the SVPP would involve an irreversible and irretrievable loss of a portion of the characteristic landscape in Rainbow Valley.

4.8 WATER RESOURCES

4.8.1 Analysis Area, Approach and Assumptions

In this section, direct and indirect impacts to water resources resulting from the SVPP consider both surface water and groundwater. The area of analysis for permanent, long-term impacts to surface water includes the Parkway footprint specific to each action alternative, the downstream portions of Waterman Wash and the West Prong, and 14 miles of the Gila River downstream of its confluence with Waterman Wash. Additional acres specific to each action alternative were considered for the area of analysis of temporary, short-term impacts during construction of SVPP. The area of analysis for both long- and short-term impacts to groundwater includes the West Salt River Valley and Rainbow Valley sub-basins, which are 1,330 square miles and 420 square miles, respectively. Environment consequences evaluated include the effect of the alternatives on existing water quantity and quality.

Surface water resources that would be impacted by this project include disturbance to surface water drainages or FEMA floodplains and changes to water quantity or quality. Because permanent disturbance to regional drainage patterns would be the primary impact of the SVPP to surface water resources, the number of wash crossings and acres of FEMA floodplains disturbed is used for evaluating the surface water conveyance; a GIS analytical tool with an overlay of each action alternative was used to aid in this analysis. Surface water quality is evaluated by the potential for change in water chemistry from erosion or release of pollutants. In regards to groundwater resources, although the water source that will be used to

meet the short-term water demands for construction of the SVPP is yet to be determined, it will likely be groundwater from the regional aquifer. Therefore, the total SVPP water demand relative to the regional aquifer is used to evaluate the potential for change in groundwater resources.

It is assumed that the SVPP will be designed to meet current Parkway design standards utilizing the June 2011 Rainbow Valley ADMP and that existing natural drainage patterns and surface water peak flows will be maintained with no on-site retention (V3 2007). With respect to groundwater, it is assumed that water demand for the SVPP will occur only during the construction phase and will be purchased from an existing source located in the local Rainbow Valley basin; no new water source will be developed. For the four-lane and six-lane features it is assumed that disturbance to the center median will be temporary, occurring only during construction.

4.8.2 No Action

Under the No Action Alternative there will be no development on BLM land, and water resources would continue to be managed under existing conditions. Existing land uses would continue and ephemeral washes within the Parkway footprint would not be impacted by new Parkway crossings. Local use of groundwater resources would continue at the existing demand level and no additional groundwater resources would be used for the construction of the SVPP.

4.8.3 Impacts Common to all Action Alternatives

The types of impacts to surface water resources would be the same for all action alternatives, however there would be a difference in the amount of impact relative to the total amount of disturbance to washes and FEMA floodplains per each action alternative.

4.8.3.1 Surface Water

There are no perennial surface water features in the project area, only ephemeral washes that flow in response to rainfall. Ephemeral washes in the project area include the West Prong, numerous tributaries to the West Prong, and Waterman Wash. Construction of each action alternative would result in direct impacts to the ephemeral washes at each location the SVPP crosses a wash. Permanent disturbance to floodplains and surface drainages at wash crossings will occur with the installation of engineered road crossing.

Per the site-specific drainage report (V3 2007), at existing conditions the peak flow in washes resulting from a 100-year, 24-hour storm event within the project area is estimated to range from 80 to 1,043 cubic feet per second. With respect to wash crossings, the applicant has committed to environmental protection measures that will maintain natural drainage patterns, and crossings have been designed to maintain the existing flow velocities. To accomplish this, the SVPP will incorporate three types of wash crossings: low-water crossings to maintain sheet flow conditions, and culvert crossings or arch-span structures to maintain channel flow conditions. Table 4-14 summarizes the wash crossings proposed for each action alternative.

Once wash crossings are installed, surface water velocity and sediment load are not expected to be significantly different from pre-construction conditions which will allow the form and function of the floodplain to stay mostly intact. As stated in Chapter 3, a complete jurisdictional delineation will need to be conducted prior to construction to support CWA Section 404 permitting, to minimize surface water impacts and to evaluate the extent to which washes within the project area exhibit characteristics the

USACE may consider indicators of potentially jurisdictional WUS, thus requiring a permit under Section 404 of the CWA.

Table 4-14. Proposed Wash Crossing Types for each Action Alternative

Impact Feature	Approximate Dimensions	Number Proposed for Alternative A (BLM Preferred Alternative)	Number Proposed for Alternative C	Number Proposed for Alternative H	Number Proposed for Sub-alternative F	Number Proposed for Sub-alternative G (BLM Preferred Sub-alternative)
Low-water crossing	200–1,600 linear feet	19	30	29	0	0
Culvert	2- to 6-foot openings	17	12	8	0	0
Arch span-type culvert (wildlife crossing)	Minimum of 12 feet high	3	2	3	0	0

4.8.3.2 Groundwater

For each action alternative, water will be required for the SVPP during the first 3 to 4 years of the project during the construction phase. Annual demands range from 3.0 to 3.5 acre-feet of water for the action alternatives and 0.06 acre-feet or less for each sub-alternative (see Table 3-13). The supply of water to meet the annual construction demands is yet to be determined but it will most likely be groundwater purchased from a local source.

While demands on groundwater in most of the west Salt River Valley has surpassed supply and has resulted in groundwater deficit, the Rainbow Valley basin has seen a decrease in demand and corresponding rise in aquifer water levels in recent years. Pumping of groundwater in the Rainbow Valley sub-basin, which began in the 1940s with development of agriculture in the area, has dropped from an annual high of 72,000 acre-feet in 1972 to less than 7,000 acre-feet per year in 2002 (Rascona 2003). Additionally, recharge to the groundwater aquifer occurs both naturally along mountain fronts and in ephemeral streambeds, and from incidental recharge of agricultural irrigation. Recharge in Rainbow Valley is unknown (ADWR 2010), but is estimated to be approximately 9,300 acre-feet per year (White 1963).

The water demand for the SVPP ranges from 3.0 to 3.5 acre-feet per year, which is 0.04% or less of the estimated recharge for the sub-basin. Because total water demands for SVPP are very minimal and because the Rainbow Valley sub-basin has recently experienced a decline in groundwater pumping and rise in water levels, impacts to groundwater quantity are considered negligible. Any impact to groundwater resources would most likely occur locally, only in the Rainbow Valley sub-basin, and have a minor, short-term impact.

With respect to groundwater quality, because BMPs will be in place to protect against potential spills during the construction phase, the potential for the SVPP to impact groundwater quality during construction would be temporary and is negligible. During operation, stormwater runoff from the SVPP will contain petroleum products from vehicles and asphalt. But because there are no retention basins planned that would collect and hold stormwater runoff long enough to allow for percolation into the aquifer, and because the depth to groundwater in the vicinity is well over 250 feet below ground surface, the potential for the SVPP to impact groundwater quality is long-term but negligible.

4.8.3.3 Two-lane Parkway

Impacts to surface water and groundwater resources common to all action alternatives for the first phase of construction of the two-lane SVPP are as described above.

4.8.3.4 Four-lane Parkway

Surface Water

When the second phase of construction (four lanes) of the SVPP occurs, it is assumed that the same number of wash crossings will need to be constructed. Therefore, the same types of impacts to surface water resources will occur, but with increased amount of disturbance to washes and floodplains varying by each action alternative. Impacts to surface water quality would be the same for the second phase of the SVPP as described above.

Groundwater

It is assumed that the same amount of groundwater would need to be used for dust control as would be used for construction of the two-lane Parkway, therefore doubling the total amount of groundwater that would be withdrawn from the local aquifer (6 to 7 acre-feet) varying by each action alternative, or 0.4 to 0.5 acre-feet for the sub-alternatives. But because the rate of groundwater withdrawal for the second phase of the SVPP would remain very minimal relative to the estimated annual recharge to the aquifer, impacts to groundwater quantity would be minor, and because the withdrawal would occur only during construction, these impacts would be short-term. Impacts to groundwater quality would be the same as described above.

4.8.3.5 Six-lane Parkway

When the third phase of construction (six lanes) of the SVPPP occurs, it is assumed that the same number of wash crossings would need to be constructed and the same amount of groundwater would need to be used for dust control as required for the two- and four-lane phases.

Surface Water

The same types of impacts to surface water resources would occur, but with an increase in the amount of disturbance to washes and floodplains varying by each action alternative. Impacts to surface water quality would be the same as described above.

Groundwater

The rate of groundwater withdrawal for construction of the third phase of the SVPP would remain the same as with the other two phases, but the total amount of groundwater that would be withdrawn from the local aquifer for all three phases would be 9.0 to 10.5 acre-feet, varying by each action alternative, or 0.5 to 0.7 acre-feet for the sub-alternatives. This total amount remains very minimal relative to the estimated annual recharge to the aquifer and impacts to groundwater quantity would be minor and short-term. Impacts to groundwater quality for this phase of the SVPP would be the same as previously described.

4.8.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.8.4.1 Surface Water

Construction of Alternative A, the BLM Preferred Alternative, would result in direct impacts to the ephemeral washes at each location where the SVPP crosses a wash. Permanent disturbance to floodplains and surface drainages at wash crossings would occur with the installation of engineered road crossing. Table 4-15 summarizes the number of wash crossings and impacts to surface water resources for Alternative A.

Table 4-15. Alternative A Two-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
39	0.9	17.8	7.3

A total of 39 wash crossings would be constructed for Alternative A, resulting in a total of 0.9 acre of temporary and/or permanent impact to washes that could possibly be jurisdictional. This constitutes 0.2% of the total project area and less than 0.0003% of the total Waterman Wash watershed. All impacts to jurisdictional washes will be subject to CWA permit general conditions, as well as any special conditions developed by the USACE. Impacts must also meet state and federal water quality standards, which are administered by ADEQ. Additionally, a site-specific SWPPP will identify temporary BMPs to control erosion and sedimentation from the project area that will be put in place prior to the start of construction activities and will remain until final stabilization has occurred. Permanent erosion control features such as concrete aprons or rip-rap will be installed at all wash crossings. Although Alternative A represents the straightest alignment, from a surface water drainage pattern perspective, the perpendicular crossings (as opposed to paralleling) of washes under Alternative A would have a moderate impact to surface water. The application of drainage modeling, mitigation measures, and design features would minimize this impact.

There are 25 acres of floodplains that would be temporarily and/or permanently impacted under Alternative A as a result of the installation of culverts and low-water crossings. Because these crossings would be engineered to preserve the washes' natural drainage patterns, permanent disturbance to floodplains as a result of the installation will have a negligible impact on the floodplain form. Because these crossings would be engineered to maintain the existing flow capacity of the washes, no changes to floodplain function due to project construction are expected to occur. Maintaining channel flow and floodplain form and function are important. The biochemical function of ephemeral channels and floodplains includes the cycling and transport of sediment, nutrients, and organic matter, all of which influence water quality and sediment deposition (Levick et al. 2008). Further, the physical, biological, and chemical integrity of floodplains is dependent on the connectivity of channels to floodplains during periodic flooding that provides opportunity for critical exchange of energy and nutrients between the channel and the floodplain (Nadeau and Rains 2007).

Mitigation measures for the SVPP include channel flows that will be maintained, floodplain function that will not be disrupted, temporary erosion control that will be in place during the construction phase of the project, and permanent erosion control measures incorporated into the project design. With these mitigation measures and a total project footprint of less than 0.2% of the total Waterman Wash watershed, impacts to surface water quality from Alternative A is long-term but minor.

With respect to nearby impaired waters, 12 miles north of the project area Waterman Wash drains 422 square miles of watershed into the Gila River. Beginning at its confluence with Waterman Wash, a 14-mile reach of the Gila River is designated as impaired for pesticides. Because the project will not involve the application of pesticides, impacts from the project in the Waterman Wash watershed are not expected to result in any further contributions of pesticide to the Gila River.

4.8.4.2 Groundwater

Impacts to groundwater resources for Alternative A would be the same as described for all action alternatives.

4.8.4.3 Two-lane Parkway

Impacts to surface water and groundwater resources from the first phase of construction of the two-lane for Alternative A are as described above.

4.8.4.4 Four-lane Parkway

Surface Water

When the second phase of Alternative A (four lanes) is constructed the same types of impacts to surface water resources would occur, but with increased amount of disturbance to washes and floodplains, as summarized in Table 4-16. Table 4-16 includes the impacts of Phase One and Phase Two. Impacts to surface water quality during the second phase of Alternative A would be the same as described above for the first phase.

Table 4-16. Alternative A Four-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
39	2.2	17.8	10.5

For the second phase of Alternative A, a total of 2.2 acres of temporary and/or permanent impact to washes would occur that could possibly be jurisdictional. This constitutes 0.5% of the total project area and less than 0.0008% of the total Waterman Wash watershed.

There are 28.3 acres of floodplains that would be temporarily and/or permanently impacted under the second phase of Alternative A as a result of the installation of culverts and low-water crossings. These crossings will be engineered to preserve the washes' natural drainage patterns, and permanent disturbance to floodplains as a result of the installation will only slightly alter the floodplain form. With these mitigation measures in place, impacts to surface water quality from the second phase of Alternative A are considered negligible.

Groundwater

Impacts to groundwater resources for the Alternative A four-lane Parkway would be the same as described for all action alternatives four-lane Parkway.

4.8.4.5 Six-lane Parkway

Surface Water

When the third phase of Alternative A (six lanes) is constructed, the same types of impacts to surface water resources would occur, with increased amount of disturbance to washes and floodplains as summarized in Table 4-17. Table 4-17 includes the impacts of Phase One, Two, and Three.

Table 4-17. Alternative A Six-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
39	2.5	17.8	11.9

For the third phase of Alternative A, a total of 2.5 acres of temporary and/or permanent impact to washes would occur that could possibly be jurisdictional. This constitutes 0.5% of the total project area and less than 0.0009% of the total Waterman Wash watershed.

There are 29.7 acres of floodplains that would be temporarily and/or permanently impacted under the third phase of Alternative A as a result of the installation of culverts and low-water crossings. With proposed mitigation measures in place, impacts to surface water quality from the third phase of Alternative A are considered negligible.

Groundwater

Impacts to groundwater resources for the Alternative A six-lane Parkway would be the same as described for all action alternatives six-lane Parkway.

4.8.5 Alternative C Direct and Indirect Impacts

4.8.5.1 Surface Water

The type and magnitude of direct impacts to surface water for Alternative C are the same as for Alternative A with slight differences in total impacts (Table 4-18) and as described below. Alternative C will require construction of the most wash crossings, with a total of 44 resulting in direct impacts of 1.2 acres of washes and 40.3 acres of impact to floodplains.

Table 4-18. Alternative C Two-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
44	1.2	30.5	9.8

Unlike Alternative A, Alternative C would include six curves. Alternative C does not include fewer perpendicular wash crossings than Alternative A (in fact there are five additional crossings), but Alternative C would cross many of the washes in a parallel layout, which decreases impacts to surface water since the wash crossing may not require extensive excavation within the wash. From a surface water drainage pattern perspective, these curves avoid some perpendicular wash crossings and would

therefore have commensurately less impact to surface water than Alternative A. The application of drainage modeling during engineering and design, mitigation measures, and design features would minimize this impact.

Groundwater

Impacts to groundwater resources for Alternative C would be the same as described for all action alternatives.

4.8.5.2 Two-lane Parkway

Impacts to surface water and groundwater resources from the first phase of construction of the two-lane for Alternative C are described above.

4.8.5.3 Four-lane Parkway

Surface Water

When the second phase of Alternative C (four lanes) is constructed, the same types of impacts to surface water resources will occur as in the first phase, but with increased amount of disturbance to washes and floodplains (Table 4-19). Table 4-18 includes the impacts of Phase One and Phase Two. Impacts to surface water quality during the second phase of Alternative C would be the same as described above for the first phase.

Table 4-19. Alternative C Four-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
44	2.9	30.5	14.0

For the second phase of Alternative C, a total of 2.9 acres of temporary and/or permanent impact to washes that could be jurisdictional would occur, which constitutes 0.5% of the total project area and less than 0.001% of the total Waterman Wash watershed. There are 44.5 acres of floodplains that would be temporarily and/or permanently impacted under the second phase of Alternative C.

Groundwater

Impacts to groundwater resources for the Alternative C four-lane Parkway would be the same as described for all action alternatives four-lane Parkway.

4.8.5.4 Six-lane Parkway

Surface Water

When the third phase of Alternative C (six lanes) is constructed the same types of impacts to surface water resources would occur, with increased amount of disturbance to washes and floodplains as summarized in Table 4-20. Table 4-20 includes the impacts of Phase One, Two, and Three.

Table 4-20. Alternative C Six-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
44	3.3	30.5	13.7

For the third phase of Alternative C, a total of 3.3 acres of temporary and/or permanent impact to washes would occur that could possibly be jurisdictional. This constitutes 0.6% of the total project area and less than 0.001% of the total Waterman Wash watershed.

There are 44.2 acres of floodplains that would be temporarily and/or permanently impacted under the third phase of Alternative C.

Groundwater

Impacts to groundwater resources for the Alternative C six-lane Parkway would be the same as described for all action alternatives six-lane Parkway.

4.8.6 Alternative H Direct and Indirect Impacts

Surface Water

The type and magnitude of direct impacts to surface water for Alternative H are the same as for Alternative A, with slight differences in total impacts (Table 4-21) and as described below. Alternative H would require 40 wash crossings, resulting in direct impacts of 1.1 acres of washes and 45.9 acres of impact to floodplains.

Table 4-21. Alternative H Two-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
40	1.1	34.5	11.4

Unlike Alternative A, Alternative H would include three curves. Alternative H does not include fewer perpendicular wash crossings than Alternative A (in fact there is one additional crossing), but Alternative H would cross many of the washes in a parallel layout, which decreases impacts to surface water since the wash crossing may not require extensive excavation within the wash. From a surface water drainage pattern perspective, these curves avoid some perpendicular wash crossings and would therefore have commensurately less impact to surface water than Alternative A. The application of drainage modeling during engineering and design, mitigation measures, and design features would minimize this impact.

Groundwater

Impacts to groundwater resources for Alternative H would be the same as described for all action alternatives.

4.8.6.1 Two-lane Parkway

Impacts to surface water and groundwater resources from the first phase of construction of the two-lane for Alternative H are described above.

4.8.6.2 Four-lane Parkway

Surface Water

When the second phase of Alternative H (four lanes) is constructed, the same types of impacts to surface water resources would occur as in the first phase, but with increased amount of disturbance to washes and floodplains as summarized in Table 4-22. Table 4-22 includes the impacts of Phase One and Phase Two. Impacts to surface water quality during the second phase of Alternative H would be the same as for the first phase.

Table 4-22. Alternative H Four-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
40	3.8	34.5	15.6

For the second phase of Alternative H, a total of 3.8 acres of temporary and/or permanent impact to washes that could be jurisdictional would occur, which constitutes 0.7% of the total project area and less than 0.001% of the total Waterman Wash watershed. There are 50.1 acres of floodplains that would be temporarily and/or permanently impacted under the second phase of Alternative H.

Groundwater

Impacts to groundwater resources for the Alternative H four-lane Parkway would be the same as described for all action alternatives four-lane Parkway.

4.8.6.3 Six-lane Parkway

Surface Water

When the third phase of Alternative H (six lanes) is constructed, the same types of impacts to surface water resources would occur, with increased amount of disturbance to washes and floodplains as summarized in Table 4-23. Table 4-23 includes the impacts of Phase One, Two, and Three.

Table 4-23. Alternative H Six-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
40	4.2	34.5	15.5

For the third phase of Alternative H, a total of 4.2 acres of temporary and/or permanent impact to washes would occur that could possibly be jurisdictional. This constitutes 0.8% of the total project area and less than 0.002% of the total Waterman Wash watershed.

There are 50.0 acres of floodplains that will be temporarily and/or permanently impacted under the third phase of Alternative H.

Groundwater

Impacts to groundwater resources for the Alternative H six-lane Parkway would be the same as described for all action alternatives six-lane Parkway.

4.8.7 Sub-alternative F Direct and Indirect Impacts

4.8.7.1 Two-lane Parkway

Surface Water

The type and magnitude of direct impacts to surface water for Sub-alternative F are the same as for Alternative A with differences in total impacts (Table 4-24). Sub-alternative F will directly impact 0.1 acre of washes and 20.1 acres of floodplains.

Table 4-24. Sub-alternative F Two-lane: Surface Water Impacts

Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
0.1	15.1	5.0

Groundwater

Impacts to groundwater resources for Sub-alternative F would be the same as described for all action alternatives.

4.8.7.2 Four-lane Parkway

Surface Water

When the second phase of Sub-alternative F (four lanes) is constructed, the same types of impacts to surface water resources would occur as in the first-phase, but with increased amount of disturbance to washes and floodplains as summarized in Table 4-25. Table 4-25 includes the impacts of Phase One and Phase Two. Impacts to surface water quality during the second phase of Sub-alternative F would be the same as for the first phase.

Table 4-25. Sub-alternative F Four-lane: Surface Water Impacts

Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
0.3	15.1	6.8

A total of 0.3 acre of temporary and/or permanent impact to washes that could be jurisdictional would occur, which constitutes 0.3% of the total project area and less than 0.0001% of the total Waterman Wash watershed. There are 21.9 acres of floodplains that would be temporarily and/or permanently impacted under the second phase of Sub-alternative F.

Groundwater

Impacts to groundwater resources for the Sub-alternative F four-lane Parkway would be the same as described for all action alternatives four-lane Parkway.

4.8.7.3 Six-lane Parkway

Surface Water

When the third phase of Sub-alternative F (six lanes) is constructed, the same types of impacts to surface water resources would occur, with increased amount of disturbance to washes and floodplains as summarized in Table 4-26. Table 4-26 includes the impacts of Phase One, Two, and Three.

Table 4-26. Sub-alternative F Six-Lane: Surface Water Impacts

Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
0.8	15.1	7.3

A total of 0.8 acre of temporary and/or permanent impact to washes that could possibly be jurisdictional would occur. This constitutes 0.8% of the total project area and less than 0.0003% of the total Waterman Wash watershed. There are 22.4 acres of floodplains that would be temporarily and/or permanently impacted under the third phase of Sub-alternative F.

Groundwater

Impacts to groundwater resources for the Sub-alternative F six-lane Parkway would be the same as described for all action alternatives six-lane Parkway.

4.8.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.8.8.1 Two-lane Parkway

Surface Water

The type and magnitude of direct impacts to surface water for Sub-alternative G, the BLM Preferred Sub-alternative, are the same as for Alternative A with differences in total impacts (Table 4-27). Sub-alternative G will directly impact 0.04 acre of washes with no impact to floodplains.

Table 4-27. Sub-alternative G Two-lane: Surface Water Impacts

Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
0.04	0	0

Groundwater

Impacts to groundwater resources for Sub-alternative G would be the same as described for all action alternatives.

4.8.8.2 Four-lane Parkway

Surface Water

When the second phase of Sub-alternative G (four lanes) is constructed, the same types of impacts to surface water resources would occur as in the first-phase, but with increased amount of disturbance to washes and floodplains as summarized in Table 4-28. Table 4-28 includes the impacts of Phase One and Phase Two. Impacts to surface water quality during the second phase of Sub-alternative G would be the same as for the first phase.

Table 4-28. Sub-alternative G Four-lane: Surface Water Impacts

Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
0.2	0	0

A total of 0.2 acre of temporary and/or permanent impact to washes that could be jurisdictional would occur, which constitutes 0.3% of the total project area and less than 0.0001% of the total Waterman Wash watershed. There are no impacts to floodplains under the second phase of Sub-alternative G.

Groundwater

Impacts to groundwater resources for the Sub-alternative G four-lane Parkway would be the same as described for all action alternatives four-lane Parkway.

4.8.8.3 Six-lane Parkway

Surface Water

When the third phase of Sub-alternative G (six lanes) is constructed, the same types of impacts to surface water resources would occur, with increased amount of disturbance to washes and floodplains (Table 4-29). Table 4-29 includes the impacts of Phase One, Two, and Three.

Table 4-29. Sub-alternative G Six-lane: Surface Water Impacts

Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
0.2	0	0

A total of 0.2 acre of temporary and/or permanent impact to washes that could possibly be jurisdictional would occur. This constitutes 0.3% of the total project area and less than 0.0001% of the total Waterman Wash watershed. There are no impacts to floodplains under the third phase of Sub-alternative G. Table 4-30 below provides a summary of surface water impacts for all action alternatives and sub-alternatives.

Table 4-30. Summary of Action Alternatives and Sub-alternatives: Surface Water Impacts

Action Alternative or Sub-alternative	No. of Wash Crossings, Entire ROW	Wash Area, Two-lane Four-lane Six-lane Total (acres)	FEMA Floodplains Temporary Impacts, Entire ROW (designated and/ or pending, in acres)	FEMA Floodplains Permanent Impacts, Two-lane Four-lane Six-lane Total (designated and/ or pending, in acres)
Alternative A	39	0.9 1.3 0.3 **2.5**	17.8	7.3 3.2 1.4 **11.9**
Alternative C	44	1.2 1.7 0.4 **3.3**	30.5	9.8 4.2 0.0 **14.0**
Alternative H	40	1.1 2.7 0.4 **4.2**	34.5	11.4 4.2 0.0 **15.5**
Sub-alternative F	0	0.1 0.2 0.5 **0.8**	15.1	5.0 1.8 0.5 **7.3**
Sub-alternative G	0	0.04 0.16 0.00 **0.20**	0	0 0 0 **0**

Groundwater

Impacts to groundwater resources for the Sub-alternative G six-lane Parkway would be the same as described for all action alternatives six-lane Parkway.

4.8.9 Additional Mitigation Measures

No additional mitigation measures for water resources are proposed.

4.8.10 Residual Impacts

There are no additional mitigation measures; therefore the residual impacts to water resources are the same as discussed above.

4.8.11 Short-term Uses versus Long-term Productivity

The long-term use of the project area for the SVPP will have no impact on the long-term productivity of surface water resources. As described above, the surface water control structures would be designed to maintain the natural drainage pattern and flow velocities of the project area, and BMPs will allow the water quality to be maintained. In regards to groundwater, the SVPP does not involve development of groundwater resources and use of groundwater is very minimal. The short-term use of a small amount of groundwater during the construction phase of the SVPP will not have an impact on the long-term productivity of groundwater resources.

4.8.12 Irreversible and Irretrievable Commitment of Resources

The footprint of the SVPP will physically impact washes and floodplains with the installation of permanent culverts, paved low-water crossings, and paved ROW within floodplains. However this will have minimal effect on surface quantity and quality because the project will be designed to maintain natural drainage patterns, maintain existing flows, and preserve the form and function of the floodplain. Because existing flows and floodplain form will be maintained, there will be no irreversible or irretrievable commitment of surface water flow. The surface water quality would be irreversibly changed since the proposed SVPP would introduce an impermeable surface, increasing the time water can naturally filter into the ground and surface flow velocity.

With respect to groundwater resources, the short-term impact of the use of groundwater during the construction phase of the project will be an irretrievable commitment of resources for the 3 to 4 years it is impacted. The commitment of groundwater resources is not irreversible though. Natural recharge will still occur in washes and along mountain fronts and any groundwater consumed by the SVPP during the construction phase will be recovered by recharge to the aquifer.

4.9 WILDLAND FIRE MANAGEMENT

4.9.1 Analysis Area, Approach and Assumptions

The analysis area for describing impacts to wildland fire management is the proposed 250-foot-wide ROW, Parkway alignments under the jurisdiction of the BLM's wildland fire management plans, and activities and lands immediately adjacent to the proposed ROW. This section analyzes the potential impacts that the Proposed Action and alternatives would have on fuel loads, the risk of fire ignition, the risk of a wildland fire spreading to adjacent lands, and BLM wildland fire management responsibilities. No assumptions are necessary to analyze the potential impacts that the Proposed Action and alternatives would have on the BLM's wildland fire management responsibilities.

4.9.2 No Action

Under the No Action alternative, the BLM's wildland fire management responsibilities would be the same for the analysis area as currently identified in the Lower Sonoran RMP. No change would occur to the existing vegetation, therefore, the existing fuel loads, risk of ignition, and risk of wildland fire spreading to adjacent lands would remain the same.

4.9.3 Impacts Common to all Action Alternatives

The Proposed Action, action alternatives and sub-alternatives would have the same impact to the BLM's wildland fire management responsibilities because: 1) the same vegetation clearing, Parkway construction, landscaping activities, and eventual traffic would occur under all action alternative alignments, and 2) each action alternative's alignment is located in or adjacent to BLM lands with the same fire characteristics and wildland fire classifications. These are:

1) vegetation type as related to fire ecology
2) fire and fuel management Allocation 2 area

3) Wildland Urban Interface (WUI) areas in the northern and southern termini
4) Fire Regime V and Condition Class 1 area

4.9.3.1 Fuel Load

All action alternatives would clear the existing vegetation prior to construction within the ROW of the alignment. As described in Chapter 3, vegetation throughout the analysis area is sparse and dominated by creosote flats with intermittent xeroriparian vegetation along ephemeral drainages. These vegetation types are not conducive to wildland fires that may cause irreparable harm to the environment as indicative of their designation as an Allocation 2 management area and Fire Regime V and Condition Class 1 area. The removal of this vegetation during clearing activities would lower the fuel load further within the ROW of the alternative alignments; however, the removal of trees and shrubs (fuel load) would likely increase the amount of herbaceous (grasses and forbs) fuel loads. The potential for an increase in herbaceous fuel load directly adjacent to the proposed Parkway would be further increased due to water infiltration and ponding next to the impenetrable (i.e., pavement or asphalt) surfaces. Therefore, there would be a direct impact to the fuel loads within the analysis area by the vegetation clearing. The impact would be temporary during the construction of the Parkway before landscaping activities return the vegetation levels in the non-Parkway areas of the ROW to near-existing conditions. An increase in the number of lanes (from two to four or six) would decrease the amount of land within the ROW that would be available to landscape and subsequently revegetate.

4.9.3.2 Ignition Risk

Fire ignition risk from the heavy equipment used to clear the vegetation and construct the Parkway would be negligible due to the use of spark arrestors on heavy equipment. Traffic of all types would occur on the Parkway once it is constructed and would also constitute a low risk of ignition. An increase in traffic would lead to an increase of human presence within the analysis area; however, only vehicle travel would be permitted within the ROW. As discussed above in Section 4.9.3.1, there would be an anticipated increase in the continuity of herbaceous fuel loads. When combined with the anticipated increase in human presence, the existing ignition risk would increase.

4.9.3.3 Wildland Fire Risk

There would be a low risk of fires emanating from the construction site and constructed Parkway and spreading to adjacent lands. However, since the amount of herbaceous fuels and human presence are likely to increase, the risk of wildland fire also increases. Landscaping would return the non-Parkway areas within the ROW to vegetation levels consistent with the low fire risk vegetation in the surrounding natural lands. A risk associated with active wildland fires would be the smoke created from burning fuel, which grows commensurately thicker according to the severity of the wildfire. Active wildland fires along Parkways are therefore more likely to increase the risk to firefighters and other emergency personnel since thick smoke may impede Parkway travel and increase response times. The Parkway would increase access and decrease response times to fires, should they occur. This would represent a beneficial impact and decrease the risks of wildland fires starting along the Parkway alignment and spreading to adjacent Public lands.

4.9.3.4 BLM Wildland Fire Management Responsibilities

The Proposed Action and action alternatives would not impact the BLM's current fuel and fire management Allocation 2 area classification for the lands within and immediately adjacent to the ROW. The primary objective for fuels and fire management would be to actively suppress fires as quickly as

possible. Once constructed, the Parkway would enable faster response times to fires, should they occur. A fire management plan would be included in the Plan of Development (POD). Therefore, the Parkway would have a beneficial impact on the BLM's current management objective of quickly suppressing fires within the analysis area.

Because the majority of the Parkway would go through undeveloped natural land, the proposed alternatives would not constitute an addition to the WUI. The existing WUIs at the termini of the proposed alternative alignments would remain the same.

The Fire Regime V and Condition Class 1 classifications would also remain because the ROW and adjacent lands would not depart from their historical fire regime and historical range.

4.9.4 Additional Mitigation Measures

Due to the comprehensiveness of the design and construction specifications as described in Chapter 2, two additional mitigation measures are proposed for the SVPP to minimize wildland fire risks associated with invasive plant species:

- All earth-moving equipment, hauling equipment, and other machinery will be inspected and washed with compressed air to remove any attached seeds, roots and rhizomes, and soil or other debris prior to entering or leaving the construction site.
- Verify that any soils or other materials imported for fill or restoration activities are certified as free of noxious and invasive plant species.

4.9.5 Residual Impacts

Because no additional mitigation measures are suggested, residual impacts to wildland fire management would be the same as discussed under all action alternatives.

4.9.6 Short-term Uses versus Long-term Productivity

Over the long term, fire suppression activities would benefit from the increased access to the analysis area under the Proposed Action, action alternatives, and sub-alternatives.

4.9.7 Irreversible and Irretrievable Commitment of Resources

Implementation of any of the alternatives, including the No Action, would likely result in an irreversible commitment of resources regarding wildland fire management due to the likelihood of the introduction of invasive, non-native plants. Many invasive, non-native plants are fire-tolerant (unlike many native plants) and would rapidly recover and spread following a wildland fire faster than native species. Loss of native vegetation species due to potential invasive, non-native plants species proliferating and out-competing native species following a wildland fire would be an irreversible commitment of resources.

4.10 WILDLIFE

4.10.1 Analysis Area, Approach and Assumptions

This section describes the impacts of the Proposed Action and alternatives, as described in Chapter 2, on wildlife resources within the project area, including endangered, threatened, special-status, and other sensitive terrestrial species. Five federal regulations pertain to wildlife resources in and adjacent to the project area: 1) those wildlife species listed by the USFWS under the ESA; 2) those wildlife species listed as Sensitive by the BLM under BLM Manual Section 6840; 3) those migratory bird species protected under the MBTA; 4) BCC species listed by the USFWS; and 5) the BGEPA, which gives protection to bald and golden eagles. In addition, there are two sets of Arizona State regulations pertinent to the wildlife species addressed in this section: 1) Species of Greatest Conservation Need as listed by the AGFD; and 2) game species as managed by the AGFD and BLM.

When considering the potential effects and impacts of this proposed project, an analysis area must be defined that accounts for all direct and indirect effects and impacts. For the impact analysis for wildlife resources, the analysis area is defined widely: it includes the actual footprint of the project area, i.e., the 250-foot-wide ROW, plus a regional area to account for movement of individual animals. This regional area includes the Rainbow Valley with the following boundaries: the Sierra Estrella Mountains to the north and northeast, the Buckeye Hills to the north and west-northwest, the Maricopa Mountains to the south and southwest, and SR 238 to the south. This 78,249-acre analysis area was defined in this manner because of the topography and movement patterns of the animals on a regional scale and includes approximately 70,355 acres of LCRV desertscrub, 7,022 acres of Arizona Upland desertscrub, and 872 acres of xeroriparian vegetation. In addition, the analysis area contains 560 acres of BLM-designated Category I Sonoran desert tortoise habitat, 14,833 acres of BLM-designated Category II Sonoran desert tortoise habitat, and 40,497 acres of wildlife movement corridors, including two designated wildlife movement corridors—the Sierra Estrella–SDNM linkage as designated in the Arizona Wildlife Linkages Assessment (2006) and a BLM-designated wildlife corridor adopted from the AGFD Bighorn Sheep Management Plan. The project area is located within a low-lying valley, which is surrounded by several mountain ranges and includes fragmented habitat patches due to urban/suburban/agricultural development and transportation networks in the area. Animals from these mountain areas are known to move through the valley periodically when relocating to other mountain ranges in the region; thus, potential effects and impacts to the movement patterns of these animals must be considered when defining this action area. SR 238 was selected as the southern boundary because of the existing roadway and adjacent railroad, which currently act as a barrier limiting wildlife movement. As a result of defining this analysis area for this wildlife resource impacts analysis, all effects and impacts as presented will include not only the project area but also the regional area in order to evaluate the connectivity of movement patterns for wildlife species in the region, e.g., potential fragmentation of habitat, and any potential movement disruptions that may occur as a result of this project, as well as potential mortality. In addition, the cumulative impacts to wildlife resources were analyzed in the Rainbow Valley area of analysis, as discussed in Section 4.10.9.

The assumptions utilized in the analysis of impacts to wildlife resources include:

- the “Applicant Committed Environmental Protection Measures” as described in Section 2.5 will be followed;
- the design, construction, and operation activities would adhere to the specifications as outlined in Chapter 2;
- the presence of wildlife species is closely tied to the presence and quality of a vegetation community or resource;

- vegetation communities provide breeding, foraging, cover, and movement habitat for wildlife species, thus are synonymous with wildlife habitat, and therefore can be used to quantify loss or degradation of wildlife habitat;
- surface water flow throughout the area will only be minimally affected (see Section 4.8, Water Resources);
- the area where xeroriparian vegetation is located is equal to the associated floodplain of ephemeral washes in the project area;
- for amphibian species, the analysis determined that habitat removal and dispersal impacts were the only potential effects to consider. Furthermore, amphibian habitat was equated with the xeroriparian habitat associated with the two large washes in the project area, i.e., Waterman Wash and West Prong, where amphibian species would be most likely to occur;
- for bat species, the analysis determined that removal of foraging habitat would be the only potential effect to consider. Furthermore, bat foraging habitat was equated with both LCRV and xeroriparian vegetation types where this species could forage;
- for bird species, the analysis determined that removal of nesting habitat would be the only potential effect to consider, since the MBTA only protects birds, nests, and eggs (i.e., nesting habitat only, and not other habitat such as foraging habitat). An exception is for the golden eagle, where foraging habitat removal would be the only potential effect to consider, since suitable nesting habitat is not present within the project or analysis area and the BGEPA protects all aspects of eagle habitat. Furthermore, nesting habitat for most bird species was equated with xeroriparian habitat associated with Waterman Wash and West Prong, i.e., large washes with dense xeroriparian vegetation, since this is where suitable bird nesting habitat is most likely to occur. Exceptions are for 1) Costa's hummingbird, LeConte's thrasher, white-winged dove, and mourning dove nesting habitat, which includes both LCRV and xeroriparian vegetation; 2) western burrowing owl nesting habitat, which includes only LCRV vegetation; and 3) Bell's vireo nesting habitat, which includes xeroriparian vegetation associated with all washes, i.e., not just large washes;
- for reptile species, the analysis determined that habitat removal and dispersal impacts were the only potential effects to consider. Furthermore, both LCRV and xeroriparian habitat were equated with habitat for these species;
- for large mammal species, the analysis determined that dispersal and movement impacts were the only potential effects to consider; except for the javelina where impacts to all habitat types (i.e., dispersal, foraging, shelter, and breeding) were considered; and
- for effects to BLM-designated Sonoran desert tortoise Category I habitat, impacts are considered major, since BLM planning for this habitat category specifies there should be no net loss.

In addition, impact determinations were based on calculations of disturbance acreage to vegetation types, including LCRV Sonoran Desertscrub and xeroriparian as associated with habitat types for species, i.e., general habitat, nesting habitat, and dispersal/movement habitat. Impact indicators were assigned based mainly on the assumption that vegetation removal is equal to habitat removal and that impact would be considered a long-term impact since desert vegetation does not recover rapidly. Alternative comparisons were based on the relative acreage of impacts to each vegetation resource as compared to what exists within the analysis area. Cumulative impacts to wildlife were analyzed in the Rainbow Valley area of analysis, as discussed in Section 4.5.9. Thus, the approach for the analysis of impacts to wildlife in this section encompasses all of these considerations.

4.10.2 No Action

Under the No Action alternative, the SVPP would not be developed and existing land uses in the project area would continue. Management of wildlife resources would continue at the discretion of BLM management under the *Lower Sonoran Resource Management Plan* (2012a). BLM's framework for a program of multiple use and sustained yield would continue within the project area. The maintenance of environmental quality of public lands (43 USC 1781[b]) in conformance with applicable statutes, regulations, and the Lower Sonoran RMP would continue. Current land uses in the area of analysis would continue under the No Action alternative, and the project area would be available to other uses that are consistent with the Lower Sonoran RMP.

Much of the project area is vacant land. Land in the immediate vicinity of the project area and alternatives would remain primarily open desert under the No Action Alternative. As discussed in Section 3.11, current land uses in the area of analysis include dispersed outdoor recreation, agriculture, grazing, utilities, and transportation. Livestock grazing in the project area would continue in two allotments, and is already impacting wildlife resources through resource competition and habitat modification (e.g., fencing and water developments). Vehicle use of the existing dirt roads in and near the project area and the associated impacts to wildlife resources from habitat fragmentation, disruption and displacement from noise, and wildlife mortality would continue to occur as a result of vehicle use. Limited recreational foot traffic would presumably also continue at low levels. No acres of wildlife resource habitat would be disturbed beyond any currently existing surface-disturbing activities. There would be no impacts to wildlife species beyond any impacts associated with the existing conditions identified in Chapter 3.

4.10.3 Impacts Common to all Action Alternatives

The analysis of effects to wildlife resources is divided into three categories for further clarification: 1) general wildlife, 2) special-status wildlife species, and 3) wildlife connectivity/wildlife movement corridors.

4.10.3.1 Two-lane Parkway

General Wildlife

The implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway could affect general wildlife species through noise disturbance, permanent and temporary displacement, habitat degradation, habitat loss, habitat fragmentation, and individual mortality.
As described in Chapter 3, numerous general wildlife species (reptiles, amphibians, birds, and mammals) are known to occupy the project area and region. The ROW contains habitat for general wildlife, including LCRV desertscrub and xeroriparian vegetation. As described in Chapter 2, portions of the ROW would be entirely disturbed from construction and result in a loss of habitat, whereas other areas would be disturbed but then reclaimed. In addition, noise from construction and travel on the Parkway once constructed would increase the risk of displacement and mortality. Thus, implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway would result in a site-specific, minor, long-term, direct impact to general wildlife species habitat. In addition, noise and mortality impacts would result in a local, moderate, long-term, direct impact to general wildlife species due to traffic along the Parkway.

Special-Status Wildlife Species

Of the 15 species listed under the ESA by the USFWS in Maricopa County, two candidate species—the desert tortoise, Sonoran population, and the Tucson shovel-nosed snake—have the potential to occur in the project area of all alternatives. The BLM Lower Sonoran Field Office identifies 67 priority wildlife species that have the potential to occur within the Field Office region. This includes species listed as BLM Sensitive, SGCN, BCC, Game Species, and also species protected under the MBTA, BGEPA, and Arizona Native Plant Law. Twenty-six of the 67 priority species listed for the Lower Sonoran Field Office by the BLM have the potential to occur or are known to occur within the project area, and consist of reptiles, amphibians, birds, and mammals, including bats. Refer to Chapter 3 and the tables in Appendix G, Species Tables, for a complete list of these 26 species and details regarding their habitat.

The implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway could affect special-status wildlife species through noise disturbance, permanent and temporary displacement, habitat degradation, habitat loss, habitat fragmentation, and individual mortality. As described in Chapter 3, habitat (including breeding, foraging, cover, and/or movement habitat) for 26 special-status wildlife species exists in the project area and region. The ROW contains habitat for special-status wildlife, including LCRV desertscrub vegetation, xeroriparian vegetation, and BLM-designated Category I Sonoran desert tortoise habitat. As described in Chapter 2, portions of the ROW would be entirely disturbed from construction and result in a loss, whereas other areas would be disturbed but then reclaimed. In addition, noise from construction and travel on the Parkway once constructed would increase the risk of displacement and mortality. Thus, the implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway would result in a site-specific, minor, long-term, direct impact to special-status wildlife species habitat; whereas the impact to BLM-designated Category I Sonoran desert tortoise habitat would result in a site-specific, major, and long-term impact. In addition, noise and mortality impacts would result in a regional, moderate, long-term, direct and indirect impact to special-status wildlife species.

Wildlife Connectivity/Wildlife Movement Corridors

Habitat fragmentation is one of the most serious threats to biodiversity worldwide (Saunders et al. 1991; Wilcox and Murphy 1985), and one of the principal factors contributing to habitat fragmentation has been road construction (Meffe and Carroll 1997). Wide-ranging species such as large carnivores and migratory big-game species are particularly vulnerable to extinction in fragmented habitats because of large home ranges, low densities, slow population growth rates, and long-range dispersal patterns (Crooks 2000, 2002; Noss et al. 1996; Woodroffe and Ginsberg 1998). The creation of new roads and road modifications, such as increased numbers of traffic lanes, repaving of lanes, and construction of non-permeable wildlife fencing, may have short- and long-term impacts to connectivity between the habitat patches that the roads bisect. Not only do these roadways separate previously connected areas of habitat, they also create a barrier effect for organisms attempting to move between patches (Yanes et al. 1995). In addition, increasing highway mortality also plays a role in eliminating more individuals from a population (Harris and Gallagher 1989). There has been an increasing amount of research devoted to the role played by roads in impacting both rare and common wildlife species that have the potential to occur within the analysis area, including mountain lions (Beier 1996; Clevenger and Waltho 2005; Dickson and Beier 2002), bighorn sheep (Bristow and Crabb 2008; Cunningham and DeVos 1992; McKinney and Smith 2007; Singer et al. 2001), deer (see review in Huijser et al. 2007), snakes (Rosen and Lowe 1994; Rudolph et al. 1998), and desert tortoises (Boarman and Sazaki 1996, 2006).

The implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway could affect the movement of wildlife species within the Rainbow Valley analysis area through noise disturbance, permanent and temporary displacement, habitat fragmentation, and individual

mortality. As described in Chapter 3, two designated wildlife movement corridors—the Sierra Estrella–SDNM linkage as designated in the Arizona Wildlife Linkages Assessment (2006) and a BLM-designated wildlife corridor adopted from the AGFD Bighorn Sheep Management Plan—are present within the project area. These linkage zones are located within the southern portions of the alternatives and have been shown to be the preferable areas for wildlife species to use when moving from one mountain range to another. Thus, implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway would result in a site-specific, minor, long-term, direct impact to wildlife movement corridors. In addition, implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway would result in a regional, moderate, long-term, direct impact to wildlife species along the entire length of the Parkway through decreased connectivity, habitat fragmentation, and individual mortality.

4.10.3.2 Four-lane Parkway

General Wildlife

The implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway could affect general wildlife species through noise disturbance, permanent and temporary displacement, habitat degradation, habitat loss, habitat fragmentation, and individual mortality. As described in Chapter 3, numerous general wildlife species (reptiles, amphibians, birds, and mammals) are known to occupy the project area and region. The ROW contains habitat for general wildlife, including LCRV desertscrub vegetation and xeroriparian vegetation. As described in Chapter 2, portions of the ROW would be entirely disturbed from construction and result in a loss of habitat, whereas other areas would be disturbed but then reclaimed. In addition, noise from construction and travel on the Parkway once constructed would increase the risk of displacement and mortality. Thus, implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway would result in a site-specific, minor, long-term, direct impact to general wildlife species habitat. In addition, noise and mortality impacts would result in a local, moderate, long-term, direct impact to general wildlife species.

Special-Status Wildlife Species

Of the 15 species listed under the ESA by the USFWS in Maricopa County, two candidate species—the desert tortoise, Sonoran population, and the Tucson shovel-nosed snake—have the potential to occur in the project area. The BLM Lower Sonoran Field Office identifies 67 priority wildlife species that have the potential to occur within the Field Office region. This includes species listed as BLM Sensitive, SGCN, BCC, Game Species, and also species protected under the MBTA, BGEPA and Arizona Native Plant Law. Twenty-six of the 67 priority species listed for the Lower Sonoran Field Office by the BLM have the potential to occur or are known to occur within the project area, and consist of reptiles, amphibians, birds, and mammals, including bats. Refer to Chapter 3 for a complete list of these 26 species and details regarding their habitat.

The implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway could affect special-status wildlife species through noise disturbance, permanent and temporary displacement, habitat degradation, habitat loss, habitat fragmentation, and individual mortality. As described in Chapter 3, habitat (including breeding, foraging, cover, and/or movement habitat) for 26 special-status wildlife species exists in the project area and region. The ROW contains habitat for special-status wildlife, including LCRV desertscrub vegetation, xeroriparian vegetation, and BLM-designated Category I Sonoran desert tortoise habitat. As described in Chapter 2, portions of the ROW would be entirely disturbed from construction and result in a loss, whereas other areas would be disturbed but then reclaimed. In addition, noise from construction and travel on the Parkway once constructed would

increase the risk of displacement and mortality. Thus, the implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway would result in a site-specific, minor, long-term, direct impact to special-status wildlife species habitat; whereas the impact to BLM-designated Category I Sonoran desert tortoise habitat would result in a site-specific, major, and long-term impact. In addition, noise and mortality impacts would result in a regional, moderate, long-term, direct and indirect impact to special-status wildlife species.

Wildlife Connectivity/Wildlife Movement Corridors

The implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway could affect the movement of wildlife species within the Rainbow Valley analysis area through noise disturbance, permanent and temporary displacement, habitat fragmentation, and individual mortality. As described in Chapter 3, two designated wildlife movement corridors—the Sierra Estrella–SDNM linkage as designated in the Arizona Wildlife Linkages Assessment (2006) and a BLM-designated wildlife corridor adopted from the AGFD Bighorn Sheep Management Plan—are present within the project area. These linkage zones are located within the southern portions of the alternatives and have been shown to be the preferable areas for wildlife species to use when moving from one mountain range to another. Thus, implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway would result in a site-specific, minor, long-term, direct impact to wildlife movement corridors. In addition, implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway would result in a regional, moderate, long-term, direct impact to wildlife species along the entire length of the Parkway through decreased connectivity, habitat fragmentation, and individual mortality.

4.10.3.3 Six-lane Parkway

General Wildlife

The implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway could affect general wildlife species through noise disturbance, permanent and temporary displacement, habitat degradation, habitat loss, habitat fragmentation, and individual mortality. As described in Chapter 3, numerous general wildlife species (reptiles, amphibians, birds, and mammals) are known to occupy the project area and region. The ROW contains habitat for general wildlife, including LCRV desertscrub vegetation and xeroriparian vegetation. As described in Chapter 2, portions of the ROW would be entirely disturbed from construction and result in a loss of habitat, whereas other areas would be disturbed but then reclaimed. In addition, noise from construction and travel on the Parkway once constructed would increase the risk of displacement and mortality. Thus, implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway would result in a site-specific, minor, long-term, direct impact to general wildlife species habitat. In addition, noise and mortality impacts would result in a local, moderate, long-term, direct impact to general wildlife species.

Special-Status Wildlife Species

Of the 15 species listed under the ESA by the USFWS in Maricopa County, two candidate species—the desert tortoise, Sonoran population, and the Tucson shovel-nosed snake—have the potential to occur in the project area. The BLM Lower Sonoran Field Office identifies 67 priority wildlife species that have the potential to occur within the Field Office region. This includes species listed as BLM Sensitive, SGCN, BCC, Game Species, and also species protected under the MBTA, BGEPA and Arizona Native Plant Law. Twenty-six of the 67 priority species listed for the Lower Sonoran Field Office by the BLM have the potential to occur or are known to occur within the project area, and consist of reptiles, amphibians,

birds, and mammals, including bats. Refer to Chapter 3 for a complete list of these 26 species and details regarding their habitat.

The implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway could affect special-status wildlife species through noise disturbance, permanent and temporary displacement, habitat degradation, habitat loss, habitat fragmentation, and individual mortality. As described in Chapter 3, habitat (including breeding, foraging, cover, and/or movement habitat) for 26 special-status wildlife species exists in the project area and region. The ROW contains habitat for special-status wildlife, including LCRV desertscrub vegetation, xeroriparian vegetation, and BLM-designated Category I Sonoran desert tortoise habitat. As described in Chapter 2, portions of the ROW would be entirely disturbed from construction and result in a loss, whereas other areas would be disturbed but then reclaimed. In addition, noise from construction and travel on the Parkway once constructed would increase the risk of displacement and mortality. Thus, the implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway would result in a site-specific, minor, long-term, direct impact to special-status wildlife species habitat; whereas the impact to BLM-designated Category I Sonoran desert tortoise habitat would result in a site-specific, major, and long-term impact. In addition, noise and mortality impacts would result in a regional, moderate, long-term, direct and indirect impact to special-status wildlife species.

Wildlife Connectivity/Wildlife Movement Corridors

The implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway could affect the movement of wildlife species within the Rainbow Valley analysis area through noise disturbance, permanent and temporary displacement, habitat fragmentation, and individual mortality. As described in Chapter 3, two designated wildlife movement corridors—the Sierra Estrella–SDNM linkage as designated in the Arizona Wildlife Linkages Assessment (2006) and a BLM-designated wildlife corridor adopted from the AGFD Bighorn Sheep Management Plan—are present within the project area. These linkage zones are located within the southern portions of the alternatives and have been shown to be the preferable areas for wildlife species to use when moving from one mountain range to another. Thus, implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway would result in a site-specific, minor, long-term, direct impact to wildlife movement corridors. In addition, implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway would result in a regional, moderate, long-term, direct impact to wildlife species along the entire length of the Parkway through decreased connectivity, habitat fragmentation, and individual mortality.

4.10.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.10.4.1 Two-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative A, the BLM Preferred Alternative, as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 178.3 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative A as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 178.5 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 178.3 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 2.5 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 31.1 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative A as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 115.9 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 15.7-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases, except for all Phase Three (six-lane Parkway) alternatives.

4.10.4.2 Four-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative A as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 421.6 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife species habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative A as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 421.1 acres of habitat for special-status wildlife out of the 78,249 acres total of habitat for special-status wildlife within the analysis area, including approximately 415.3 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 5.9 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 73.3 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative A as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately

273.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 15.7-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.4.3 Six-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative A as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 474.2 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative A as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 474.2 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 467.6 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 6.7 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 82.5 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative A as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 308.1 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 15.7-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative and all Phase One and Two alternatives, but overall essentially the same as all other Phase Three (i.e., six-lane Parkway) alternatives.

4.10.5 Alternative C Direct and Indirect Impacts

4.10.5.1 Two-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative C as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately

205.4 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative C as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 205.4 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 203.0 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 2.4 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 9.8 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative C as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 142.0 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.1-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.5.2 Four-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative C as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 485.1 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative C as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 485.1 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 479.5 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 5.6 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 23.0 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative C as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 335.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.1-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.5.3 Six-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative C as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 546.1 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative C as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 546.1 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 539.7 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 6.4 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 25.9 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative C as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 377.9 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.1-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action alternative and all Phase One and Two alternatives, but overall essentially the same as all other Phase Three (i.e., six-lane Parkway) alternatives.

4.10.6 Alternative H Direct and Indirect Impacts

4.10.6.1 Two-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative H as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 207.3 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative H as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 207.3 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 205.0 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 2.3 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 30.9 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative H as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 123.7 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.3-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.6.2 Four-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative H as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 488.3 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative H as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 488.3 acres

of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 481.0 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 7.3 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 72.8 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative H as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 305.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.3-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.6.3 Six-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative H as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 550.0 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative H as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 550.0 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 541.9 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 8.1 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 82.0 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative H as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 343.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.3-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative and all Phase One and Two alternatives, but overall essentially the same as all other Phase Three (i.e., six-lane Parkway) alternatives.

4.10.7 Sub-alternative F Direct and Indirect Impacts

4.10.7.1 Two-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Sub-alternative F as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include approximately 36.3 acres of general wildlife species habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 214.6 acres of general wildlife species habitat if Alternative A is selected; a total impact of 241.7 acres of general wildlife species habitat if Alternative C is selected; or a total impact of 243.6 acres of general wildlife species habitat if Alternative H is selected out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Sub-alternative F as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 36.3 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 35.9 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 0.4 acre of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 4.1 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 214.6 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 35.2 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative A is selected; a total impact of 241.7 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 13.9 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative C is selected; or a total impact of 243.6 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 35.0 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative H is selected.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Sub-alternative F as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 20.7 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 2.8-mile Parkway. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 136.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 12.1-mile Parkway if Alternative A is selected; a total impact of 162.7 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts

to species along the entire 16.8-mile Parkway if Alternative C is selected; or a total impact of 144.4 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 10.9-mile Parkway if Alternative H is selected.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.7.2 Four-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Sub-alternative F as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include approximately 85.6 acres of general wildlife species habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 506.8 acres of general wildlife species habitat if Alternative A is selected; a total impact of 570.7 acres of general wildlife species habitat if Alternative C is selected; or a total impact of 574.0 acres of general wildlife species habitat if Alternative H is selected out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Sub-alternative F as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 85.6 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 84.7 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 0.9 acre of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 9.6 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 506.8 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 82.9 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative A is selected; a total impact of 570.7 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 32.6 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative C is selected; or a total impact of 574.0 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 82.4 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative H is selected.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Sub-alternative F as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 49.0 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area

and impacts to species along the entire 2.8-mile Parkway. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 322.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 12.1-mile Parkway if Alternative A is selected; a total impact of 384.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 16.8-mile Parkway if Alternative C is selected; or a total impact of 354.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 10.9-mile Parkway if Alternative H is selected.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.7.3 Six-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Sub-alternative F as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include approximately 96.4 acres of general wildlife species habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 570.7 acres of general wildlife species habitat if Alternative A is selected; a total impact of 642.6 acres of general wildlife species habitat if Alternative C is selected; or a total impact of 646.4 acres of general wildlife species habitat if Alternative H is selected out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Sub-alternative F as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 96.4 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 95.4 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 1.0 acre of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 10.8 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 570.7 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 93.3 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative A is selected; a total impact of 642.6 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 36.7 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative C is selected; or a total impact of 646.4 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 92.8 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative H is selected.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Sub-alternative F as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 55.2 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 2.8-mile Parkway. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 363.3 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 12.1-mile Parkway if Alternative A is selected; a total impact of 433.1 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 16.8-mile Parkway if Alternative C is selected; or a total impact of 398.8 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 10.9-mile Parkway if Alternative H is selected.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative and all Phase One and Two alternatives, but overall essentially the same as all other Phase Three (six-lane Parkway) alternatives.

4.10.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.10.8.1 Two-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Sub-alternative G, the BLM Preferred Sub-alternative, as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include approximately 27.0 acres of general wildlife species habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 205.4 acres of general wildlife species habitat if Alternative A is selected; a total impact of 232.4 acres of general wildlife species habitat if Alternative C is selected; or a total impact of 234.3 acres of general wildlife species habitat if Alternative H is selected out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Sub-alternative G as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 27.0 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 26.9 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area and approximately 0.1 acre of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area (there is no BLM-designated Category I Sonoran desert tortoise habitat in this sub-alternative). However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 205.4 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 31.1 acres of Category I Sonoran desert

tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative A is selected; a total impact of 232.4 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 9.8 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative C is selected; or a total impact of 234.3 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 30.9 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative H is selected.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Sub-alternative G as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 17.8 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 2.4-mile Parkway. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 133.7 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 11.7-mile Parkway if Alternative A is selected; a total impact of 159.8 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 16.4-mile Parkway if Alternative C is selected; or a total impact of 141.5 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 10.5-mile Parkway if Alternative H is selected.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.8.2 Four-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Sub-alternative G as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include approximately 63.8 acres of general wildlife species habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 484.9 acres of general wildlife species habitat if Alternative A is selected; a total impact of 548.9 acres of general wildlife species habitat if Alternative C is selected; or a total impact of 552.1 acres of general wildlife species habitat if Alternative H is selected out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Sub-alternative G as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 63.8 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 63.3 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area and approximately 0.5 acre of xeroriparian vegetation out of

the 872 acres total of xeroriparian vegetation within the analysis area (there is no BLM-designated Category I Sonoran desert tortoise habitat in this sub-alternative). However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 484.9 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 73.3 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative A is selected; a total impact of 548.9 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 23.0 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative C is selected; or a total impact of 552.1 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 72.8 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative H is selected.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Sub-alternative G as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 42.0 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 2.4-mile Parkway. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 315.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 11.7-mile Parkway if Alternative A is selected; a total impact of 377.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 16.4-mile Parkway if Alternative C is selected; or a total impact of 347.5 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 10.5-mile Parkway if Alternative H is selected.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.8.3 Six-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Sub-alternative G as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include approximately 71.8 acres of general wildlife species habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 546.1 acres of general wildlife species habitat if Alternative A is selected; a total impact of 618.0 acres of general wildlife species habitat if Alternative C is selected; or a total impact of 621.8 acres of general wildlife species habitat if Alternative H is selected out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Sub-alternative G as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 71.8 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 71.3 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area and approximately 0.6 acre of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area (there is no BLM-designated Category I Sonoran desert tortoise habitat in this sub-alternative). However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 546.1 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 82.5 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative A is selected; a total impact of 618.0 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 25.9 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative C is selected; or a total impact of 621.8 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 82.0 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative H is selected.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Sub-alternative G as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 47.3 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 2.4-mile Parkway. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 355.4 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 11.7-mile Parkway if Alternative A is selected; a total impact of 425.2 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 16.4-mile Parkway if Alternative C is selected; or a total impact of 390.9 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 10.5-mile Parkway if Alternative H is selected.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative and all Phase One and Two alternatives, but overall essentially the same as all other Phase Three (six-lane Parkway) alternatives.

Table 4-31 below provides a summary of the potential impacts to wildlife habitat. Table 4-32 shows the impacts to wildlife habitat when combining the potential scenarios of an action alternative and sub-alternative combination.

Table 4-31. Summary of Impacts to Wildlife Habitat

	Total Acreage within Analysis Area	Alternative A: Two Lanes Four Lanes Six Lanes (acres)	Alternative C: Two Lanes Four Lanes Six Lanes (acres)	Alternative H: Two Lanes Four Lanes Six Lanes (acres)	Sub-alternative F: Two Lanes Four Lanes Six Lanes (acres)	Sub-alternative G: Two Lanes Four Lanes Six Lanes (acres)
Total Miles (Alternative A, C and H share common length at the north and south ends)	–	15.7	18.1	18.3	2.8	2.4
General Wildlife Habitat	78,249	178.3 421.1 474.2	205.4 485.1 546.1	207.3 488.3 550.0	36.3 85.6 96.8	27.0 63.8 71.8
Special-Status Species Habitat	78,249	178.3 421.1 474.2	205.4 485.1 546.1	207.3 488.3 550.0	36.3 85.6 96.8	27.0 63.8 71.8
LCRV Vegetation	70,355	178.3 415.3 467.6	203.0 479.5 539.7	205.0 481.0 541.9	35.9 84.7 95.4	26.9 63.3 71.3
Xeroriparian Vegetation	872	2.5 5.9 6.7	2.4 5.6 6.4	2.3 7.3 8.1	0.4 0.9 1.0	0.1 0.5 0.6
Category I Sonoran Desert Tortoise Habitat	560	31.1 73.3 82.5	9.8 23.0 25.9	30.9 72.8 82.0	4.1 9.6 10.8	0 0 0
Wildlife Connectivity/ Corridors	40,487	115.9 273.6 308.1	142.0 335.6 377.9	123.7 305.6 343.6	20.7 49.0 55.2	17.8 42.0 47.3

Table 4-32. Summary of Wildlife Impacts

	Two Lanes			Four Lanes			Six Lanes		
	Alternative A + F; Alternative A + G	**Alternative C + F; Alternative C + G**	**Alternative H + F; Alternative H + G**	**Alternative A + F; Alternative A + G**	**Alternative C + F; Alternative C + G**	**Alternative H + F; Alternative H + G**	**Alternative A + F; Alternative A + G**	**Alternative C + F; Alternative C + G**	**Alternative H + F; Alternative H + G**
Total Miles	16.1; 15.7	18.7; 18.1	18.5; 18.3	16.1; 15.7	18.7; 18.1	18.5; 18.3	16.1; 15.7	18.7; 18.1	18.5; 18.3
General Wildlife Habitat (acres)	214.6; 205.4	241.7; 232.4	243.6; 234.3	506.8; 484.9	570.7; 548.9	574.0; 552.1	570.7; 546.1	642.6; 618.0	646.4; 621.8
Special-Status Species Habitat (acres)	214.6; 202.8	241.7; 232.4	243.6; 234.3	506.8; 484.9	570.7; 548.9	574.0; 552.1	570.7; 546.1	642.6; 618.0	646.4; 621.8
LCRV Vegetation (acres)	211.7; 202.8	238.9; 229.9	240.9; 232.0	500.0; 478.6	564.2; 542.8	565.7; 544.3	563.0; 538.8	635.1; 611.0	637.3; 613.2
Xeroriparian Vegetation (acres)	2.9; 2.6	2.8; 2.5	2.7; 2.4	6.8; 6.3	6.5; 6.1	8.3; 7.8	7.7; 7.2	7.4; 7.0	9.1; 8.7
Category I Sonoran Desert Tortoise Habitat (acres)	35.2; 31.1	13.9; 9.8	35.0; 30.9	82.9; 73.3	32.6; 23.0	82.4; 72.8	93.3; 82.5	36.7; 25.9	92.8; 82.0
Wildlife Connectivity/ Corridors (acres)	136.6; 133.7	162.7; 159.8	144.4; 141.5	322.6; 315.6	384.6; 377.6	354.6; 347.5	363.3; 355.4	433.1; 425.2	398.8; 390.9

4.10.9 Additional Mitigation Measures

Although the design and construction specifications as described in Chapter 2 will help to reduce the impacts to wildlife resources, several additional mitigation measures are proposed for the SVPP to minimize impacts to wildlife resources.

- Pre-construction surveys of the ROW should be conducted by a qualified biologist. These surveys should focus on burrowing species, such as the Sonoran desert tortoise and the western burrowing owl, but additional species such as Tucson shovel-nosed snake, raptor nests, and other species identified with the potential to occur in the area would also need to be included. From the results of these pre-construction surveys, the BLM may require that a biological construction monitor also be present during the initial clearing phases to help protect wildlife from harm and/or that relocation plans be developed for any species requiring relocation from the project area.
- During design, consultation with AGFD in coordination with BLM, on wildlife mitigation designs and siting during the development of the final engineering plans and construction phases should be conducted.
- Due to the presence of designated Category I Sonoran desert tortoise habitat, a Sonoran Desert Tortoise Mitigation Plan should be developed for this project in conjunction with the BLM. This plan should follow the *Recommended Standard Mitigation Measures for Projects in Sonoran Desert Tortoise Habitat* (Arizona Interagency Desert Tortoise Team 2008).
- During construction, vehicle speeds within the ROW and access roads will not exceed 25 miles per hour in order to protect wildlife during construction.
- All construction personnel shall attend a wildlife awareness training conducted by a qualified biologist prior to commencement of construction activities in order to educate the construction crew of potential wildlife and how to protect the species from harm.
- To the extent practicable, design and construction should try to minimize the construction staging areas and associated impacts within the designated wildlife linkage areas. In addition, minimizing removal of vegetation during construction at washes crossings within the designated wildlife linkage areas and restoration post construction to restore cover on approaches to wildlife crossing structures should be considered to increase the overall success of wildlife using the crossing structures.
- The *Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects* (AGFD 2007b) should be followed if any tortoises are encountered during construction. Handling of tortoises will be conducted by qualified personnel to remove tortoise from harm's way.
- All ephemeral washes present within the BLM-designated Category I Sonoran desert tortoise habitat should be constructed with culverts suitable for tortoises to move under the Parkway and to help reduce potential mortality.
- During design, the Rainbow Valley ADMP (RVADMP) drainage plan and crossing structure recommendations for designated Sonora Wash Corridors within the project area should be consulted and implemented to the extent practicable.
- Due to the presence of designated Category I Sonoran desert tortoise habitat and per BLM Instructional Memorandum No. AZ-2009-010, compensation for the loss of this protected habitat must follow the 5:1 compensation ration specified in the November 1991 Compensation for the Desert Tortoise document (BLM 1991). Once an alternative is selected, then the BLM will calculate this compensatory mitigation.

- Due to the presence of designated Category I Sonoran desert tortoise habitat and two designated wildlife linkages, the selected alternative should be redesigned to include additional culvert crossings for wildlife in these areas, i.e., additional crossings will be needed outside of drainage areas to accommodate safe passage of wildlife through the area.
- Fences installed along the perimeter of the ROW should be constructed with the BLM standard mule deer wire configuration, i.e., four strands with smooth wire on the bottom.
- Signage should be placed along the Parkway, especially in the southern portions where designated wildlife linkages are present, to warn motorists to drive carefully and watch for wildlife. This may help reduce wildlife mortality. The exact locations and wording should be developed in accordance with the BLM.
- In conjunction with the BLM, a Post-Construction Wildlife Crossing Monitoring Plan should be prepared and implemented, particularly within designated wildlife corridors. The goal would be to gather data, such as road kill occurrences in terms of numbers and locations, culvert use by wildlife to assess whether the opening ratio is sufficient for wildlife, wildlife-friendly fence structure and layout effectiveness, monitoring cameras, and sign placement effectiveness. These data would then be used to assess if any additional modifications are necessary in order to reduce wildlife mortality along the Parkway and provide safer routes for wildlife across the Parkway.

4.10.10 Residual Impacts

Residual impacts would include the long-term removal of habitat for general wildlife and special-status wildlife species within the project area. These species that currently inhabit the project area would be permanently displaced into the adjacent areas. Additionally, the noise and mortality impacts would remain a possibility even with the implementation of the mitigation measures; however, these impacts should be reduced through implementation of mitigation measures. Lastly, the mitigation measures will help to provide safe passage for wildlife species across the road, but road-related barrier effects may still occur and result in reduced gene flow between some wildlife populations.

4.10.11 Short-term Uses versus Long-term Productivity

Since the paved road bed surface will remain for an indeterminate amount of time in the future and these areas are not expected to ever be reclaimed and revegetated, long-term productivity of this general wildlife and special-status wildlife species habitat will be negatively impacted. In addition, those areas that are reclaimed will have a lag in return to full productivity given that desert ecosystems can take up to 50 years to return to pre-disturbance conditions (Guo 2004; Kade and Warren 2002). Thus, the SVPP would reduce the amount of habitat available for these wildlife species and also displace wildlife individuals from habitat that has been removed or degraded. In addition, the road barrier effect to wildlife connectivity areas would affect wildlife movement patterns and potentially reduce population gene flow.

4.10.12 Irreversible and Irretrievable Commitment of Resources

Irreversible commitment of resources would include the paved road bed surface, since it will remain for an indeterminate amount of time in the future and these areas are not expected to ever be reclaimed and revegetated. Implementation of any of the action alternatives would result in 1) the irreversible and irretrievable loss of between 72.0 and 391.5 acres of general wildlife and special-status wildlife species habitat, 2) the irreversible and irretrievable loss of up to 82.5 acres of BLM-designated Category I

Sonoran desert tortoise habitat, and 3) irreversible impacts consisting of wildlife displacement, wildlife disruption, and potential mortality of wildlife utilizing the area for dispersal and movement within the region, including the designated wildlife corridors.

4.11 LANDS AND REALTY

4.11.1 Analysis Area, Approach and Assumptions

The area of analysis for analyzing direct and indirect impacts to land use resulting from the SVPP is defined as the 250-foot-wide construction ROW for all alternatives and sub-alternatives. This area of analysis was selected to account for potential direct and indirect impacts to existing land uses. Environmental consequences analyzed consider the compatibility of the alternatives with both existing and planned future land uses as well as applicable planning documents governing the use of project lands. Cumulative impacts to land use are analyzed in the Rainbow Valley area of analysis, discussed in Section 4.11.9.

It is assumed that there would be no other use of the project area except for transportation. Impacts to land uses in the area of analysis from implementation of the SVPP are discussed in terms of changes to the existing use.

4.11.2 No Action

Under the No Action Alternative, the BLM land on which the project is proposed would continue to be managed under the existing conditions. BLM's framework for a program of multiple use and sustained yield would continue within the project area. The maintenance of environmental quality of public lands (43 USC Section 1781(b)) in conformance with applicable statutes, regulations, and the Lower Sonoran RMP (BLM 2012a) would continue. Current land uses in the area of analysis would continue under the No Action Alternative, and the project area would be available to other uses that are consistent with the Lower Sonoran RMP.

Much of the project area is undeveloped land. Land in the immediate vicinity of the project area and alternatives would remain primarily open desert under the No Action Alternative. As discussed in Section 3.11, current land uses in the area of analysis include dispersed outdoor recreation, agriculture, grazing, utilities, and transportation.

4.11.3 Impacts Common to all Action Alternatives

4.11.3.1 Two-, Four-, and Six-lane Parkway

Land Ownership

The implementation of any action alternative would alter only the private land ownership of the project area discussed in Section 3.11.3, Land Ownership. Approximately 80% of the project area would continue to be owned by BLM and ASLD, but the City of Goodyear would be granted a transportation-use ROW.

The private lands (approximately 20% of the project area) would be acquired by the City of Goodyear under the 1987 Uniform Relocation Assistance and Real Property Acquisitions Act. The landowners would be compensated at market value for the land that would be acquired for the ROW, as discussed in Chapter 2. All of the private land is either undeveloped desert or agricultural land. Much of the existing

agricultural and cultivated land has not been in production for many years. Some cultivation still exists. No buildings or structures would be required to be removed.

Land Use Planning

As described in Chapter 1, the area of analysis is located within federal, state, and local planning areas. Table 4-33 outlines the plans that are applicable within the area of analysis, their goals and objectives, and consistency with those plans if any of the action alternatives is implemented.

Table 4-33. Consistency of the Project Alternatives with Local Plans

Plan	Goals/Objectives/Policy	Consistency Determination
BLM Lower Sonoran Approved Resource Management Plan (RMP) Record of Decision (2012)	Recognizes "ROWs under FLPMA are authorized for highways or systems that are in the public interest" (BLM 2012a) Major linear LUAs include "primary paved roads"*	Consistent because the RMP provides opportunities for multiple land uses in the project area, including transportation ROWs.
City of Goodyear General Plan (2003) and Amendment (2007)	Recognizes the need to "provide southern vehicular access and mobility for the forecasts for growth in the West Valley, and the limited connectivity that currently exists in Western Maricopa County" (City 2007).	Consistent because the General Plan was amended to provide for Parkway, infrastructure, and services expansion in Rainbow Valley.
Maricopa County Comprehensive Plan	Developed goal of "promoting efficient land development that is well integrated with the transportation system" (Maricopa County 2002).	Consistent because the annexation of Rainbow Valley is currently not well-integrated with the transportation system; the SVPP would integrate the area into the existing transportation system.
MAG Regional Transportation Plan	Goal # 2: Access and Mobility discusses the objective of providing safety, access, and maintaining a reliable and acceptable level of service (MAG 2007c).	Consistent because the SVPP would bring the existing, unacceptable conditions into compliance with the MAG Plan.

* As defined by the Planning and Conducting Route Inventories Technical Reference Guide 9113-1 [2006].

The consistency of the project alternatives with applicable federal and local plans would be the same for all action alternatives.

A 2-year notification letter explaining the potential ramifications of the proposed SVPP to existing grazing allottees would be mailed under any alternative. Notification would be required per existing BLM grazing regulations.

Current Land Uses

The primary land use change associated with the construction of all action alternatives is the development of currently natural or undeveloped land for a two-, four-, and six-lane Parkway in the project area.

If the SVPP is authorized, the project would have to conform to the terms and conditions of previously issued ROWs in the project area. Therefore, there would be no impacts to utility corridors and other existing ROWs (see Tables 3-15 and 3-16). Existing, authorized adjacent or intersecting linear land use facilities (transmission and utility corridors) would not be impacted if any action alternative were implemented.

Other authorized land uses, such as outdoor recreation, and grazing may experience minor displacement since these activities are dispersed and not concentrated within certain areas. Table 4-34 summarizes the impacts to land uses for the project action alternatives and sub-alternatives. The No Action Alternative is analyzed in Section 4.11.2, above.

Potential effects on land use are generally associated with project construction rather than operation because once the ROW grant has been made by BLM and construction begins, no further changes to land use patterns in the project footprint are expected. Existing land uses surrounding the project area would not be precluded during the construction period. Access to all existing land uses would be maintained.

Land Tenure

Lands identified for disposal in the analysis area are typically isolated and fragmented from larger tracks of BLM-managed lands. Disposal actions usually take place in response to a request from the public, or from an application that could result in a title transfer wherein the lands leave the public domain (BLM 2012a).

The individual acreages of lands identified by the Lower Sonoran RMP as suitable for disposal that may be impacted by each action alternative are discussed below.

4.11.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.11.4.1 Two-lane Parkway

Land Ownership

Impacts to land ownership would be similar to those described under Impacts Common to all Action Alternatives except the following.

Under Alternative A, approximately 285 acres of BLM-owned land, 32 acres of ASLD land, and 158 acres of private land would be used for the two-lane SVPP.

Land Use Planning

The Alternative A, two-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

All BLM lands used for the SVPP under Alternative A would be constructed within the existing EPNG multi-use utility corridor (BLM 2012a).

Under Alternative A, current and future land authorization uses described in Table 3-15 and Table 3-16 would not be precluded and replaced if Alternative A were implemented.

Table 4-34. Impacts to Land Uses from the SVPP

Affected Land Use	Impact				
	Alternative A (BLM Preferred Alternative)	**Alternative C**	**Alternative H**	**Sub-alternative F**	**Sub-alternative G (BLM Preferred Sub-alternative)**
Utility corridors (electrical transmission, oil/gas pipeline)	No anticipated impacts	No anticipated impacts	No anticipated impacts	No anticipated impacts	No anticipated impacts
Outdoor recreation (hunting, target shooting, backcountry driving, mountain biking, natural and cultural resources study, and sightseeing)	Loss of approximately 475 acres due to ROW occupation	Loss of approximately 549 acres due to ROW occupation	Loss of approximately 554 acres due to ROW occupation	Loss of approximately 97 acres due to ROW occupation	Loss of approximately 72 acres due to ROW occupation
Grazing	Loss of approximately 20 and 33 acres available for forage in the Beloat and Conley allotments, respectively, due to Parkway occupation and loss of plant productivity	Loss of approximately 48 and 13 acres available for forage in the Beloat and Conley allotments, respectively, due to Parkway occupation and loss of plant productivity	Loss of approximately 43 and 20 acres available for forage in the Beloat and Conley allotments, respectively, due to Parkway occupation and loss of plant productivity	Loss of approximately 11 acres available for forage in the Conley allotment due to Parkway occupation and loss of plant productivity	Loss of approximately 8 acres available for forage in the Conley allotment due to Parkway occupation and loss of plant productivity
Mineral entry	No impact	No impact	No impact	No impact	No impact
Residential	May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development	May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development	May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development	May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development	May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development
Commercial and Industrial	No impact	No impact	No impact	No impact	No impact
Airport/public/quasi-public	No impact	No impact	No impact	No impact	No impact

The Alternative A alignment would be cleared and graded when road construction begins, resulting in a land conversion from dirt road and undeveloped land to a transportation corridor. A temporary construction road would be constructed adjacent to the two-lane Parkway. Construction would preclude grazing and recreational land uses because there would be no safe access or use of the project area for these activities for the life of the project. However, the abundance of dirt roads available for recreational use and land available for grazing in the Rainbow Valley region would provide similar experiences; therefore the impact to grazing and recreational land use is minimized. Construction of the Alternative A two-lane Parkway would result in the conversion of approximately 84 acres of undeveloped land to transportation use. Construction of Alternative A would not reduce the opportunities for access to SDNM due to the current closure of all BLM routes accessible from the project area that lead into the eastern regions of SDNM.

Existing land uses surrounding Alternative A would not be directly impacted following project completion. The conversion of approximately 84 acres from undeveloped land to a Parkway would constitute a small change when compared to the expansive amount of open space and federally managed land in the surrounding region. Access to the existing land uses would be maintained during project operation.

Approximately 36.1 acres of the Alternative A two-lane Parkway would occur within the Lower Gila Terraces and Historic Trails ACEC; however, all areas of Alternative A that occur within the ACEC would be located on private land. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

The operation of Alternative A may have indirect impacts to current land uses if the Parkway creates land use amendments brought on by development interest.

Land Tenure

Under the Alternative A two-lane Parkway, there would be no BLM-managed lands identified as suitable for disposal within the 250-foot-wide ROW.

4.11.4.1 Four-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Alternative A two-lane Parkway.

Land Use Planning

The Alternative A, four-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative A four-lane Parkway would result in the additional conversion of approximately 167 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 19.3 acres of the Alternative A four-lane Parkway would occur within the Lower Gila Terraces and Historic Trails ACEC. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative A four-lane Parkway, there would be no BLM-managed lands identified as suitable for disposal within the 250-foot-wide ROW.

4.11.4.2 Six-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Alternative A two-lane Parkway.

Land Use Planning

The Alternative A, six-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative A six-lane Parkway would result in the additional conversion of approximately 220 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 19.5 acres of the Alternative A six-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative A six-lane Parkway, there would be no BLM-managed lands identified as suitable for disposal within the 250-foot-wide ROW.

4.11.5 Alternative C Direct and Indirect Impacts

Alternative C's direct and indirect impacts to land use would be the same as described under Alternative A, in addition to the following impacts.

4.11.5.1 Two-lane Parkway

Land Ownership

Impacts to land ownership would be the similar as described under Impacts Common to all Action Alternatives except the following.

Under Alternative C, approximately 319 acres of BLM-owned land, 57 acres of ASLD land, and 172 acres of private land would be used for the two-lane SVPP.

Land Use Planning

The Alternative C, two-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

The Alternative C alignment would occupy the least amount of the existing EPNG multi-use utility corridor of all the action alternatives. As such, Alternative C would require the greatest amount of vegetation clearing and grading, since the alignment covers predominantly undeveloped land.

Construction and operation of the Alternative C two-lane Parkway would result in the conversion of 171 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 59 acres of the Alternative C two-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC; however, all areas of Alternative C that occur within the ACEC would be located on private land. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative C two-lane Parkway, 9.9 acres of BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.5.2 Four-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Alternative C two-lane Parkway.

Land Use Planning

The Alternative C, four-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative C four-lane Parkway would result in the additional conversion of 171.1 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 33 acres of the Alternative C four-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative C four-lane Parkway, 8.5 acres of BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.5.3 Six-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Alternative C two-lane Parkway.

Land Use Planning

The Alternative C six-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative C six-lane Parkway would result in the additional conversion of 131.6 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 33 acres of the Alternative C six-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC; however, all areas of Alternative C that occur within the ACEC would be located on private land. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative C six-lane Parkway, approximately 6.4 acres of BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.6 Alternative H Direct and Indirect Impacts

4.11.6.1 Two-lane Parkway

Land Ownership

Impacts to land ownership would be the similar as described under Impacts Common to all Action Alternatives except the following.

Under Alternative H, 308.1 acres of BLM-owned land, 74.3 acres of ASLD land, and 171.5 acres of private land would be used for the two-lane SVPP.

Land Use Planning

The Alternative H two-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative H two-lane Parkway would result in the conversion of 241.4 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 39 acres of the Alternative H two-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC; however, all areas of Alternative H that occur within the ACEC would be located on private land. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative H two-lane Parkway, 11.6 acres of BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.6.2 Four-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Alternative H two-lane Parkway.

Land Use Planning

The Alternative H four-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative H four-lane Parkway would result in the additional conversion of 132.9 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 26 acres of the Alternative H four-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC; however, all areas of Alternative H that occur within the ACEC would be located on private land. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative H four-lane Parkway, 8.9 acres of BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.6.3 Six-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Alternative H two-lane Parkway.

Land Use Planning

The Alternative H six-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative H six-lane Parkway would result in the additional conversion of 132.9 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 23 acres of the Alternative H six-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC; however, all areas of Alternative H that occur within the ACEC would be located on private land. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative H six-lane Parkway, approximately 7 acres of BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.7 Sub-alternative F Direct and Indirect Impacts

4.11.7.1 Two-lane Parkway

Land Ownership

Impacts to land ownership would be the similar as described under Impacts Common to all Action Alternatives except the following.

Under Sub-alternative F, 2 acres of BLM-owned land and 95 acres of private land would be used for the two-lane SVPP.

Land Use Planning

The Sub-alternative F two-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives. Sub-alternative F would occur within the Lower Gila Terraces and Historic Trails ACEC wholly on private lands.

Current Land Uses

Construction and operation of the Sub-alternative F two-lane Parkway would result in the conversion of approximately 42.6 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Land Tenure

Under the Sub-alternative F two-lane Parkway, no BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.7.2 Four-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Sub-alternative F two-lane Parkway.

Land Use Planning

The Sub-alternative F four-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Sub-alternative F four-lane Parkway would result in the additional conversion of 23.2 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Land Tenure

Under the Sub-alternative F four-lane Parkway, no BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.7.3 Six-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Sub-alternative F two-lane Parkway.

Land Use Planning

The Sub-alternative F six-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Sub-alternative F six-lane Parkway would result in the additional conversion of 23.22 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Land Tenure

Under the Sub-alternative F six-lane Parkway, no BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.11.8.1 Two-lane Parkway

Land Ownership

Impacts to land ownership would be the similar as described under Impacts Common to all Action Alternatives except the following.

Under Sub-alternative G, approximately 72 acres of private land would be used for the two-lane SVPP.

Land Use Planning

The Sub-alternative G two-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives. Sub-alternative G would occur within the Lower Gila Terraces and Historic Trails ACEC wholly on private lands.

Current Land Uses

Construction and operation of the Sub-alternative G two-lane Parkway would result in the conversion of 31.7 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Land Tenure

Under the Sub-alternative G two-lane Parkway, no BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.8.2 Four-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Sub-alternative G two-lane Parkway.

Land Use Planning

The Sub-alternative G four-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Sub-alternative G four-lane Parkway would result in the additional conversion of 17.3 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Land Tenure

Under the Sub-alternative G four-lane Parkway, no BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.8.3 Six-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Sub-alternative G two-lane Parkway.

Land Use Planning

The Sub-alternative G six-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Sub-alternative G six-lane Parkway would result in the additional conversion of 17.3 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Land Tenure

Under the Sub-alternative G six-lane Parkway, no BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.9 Additional Mitigation Measures

No additional mitigation measures are suggested.

4.11.10 Residual Impacts

Because no additional mitigation measures are suggested, residual impacts to land use would be the same as discussed under all action alternatives.

4.11.11 Short-term Uses versus Long-term Productivity

Under all action alternatives, the project area lands would be converted from their existing respective land uses (i.e., grazing, agriculture, dispersed recreation) to a transportation-based land use. The current productivity of the project area (i.e., within the 250-foot-wide ROW) for grazing, agriculture, and dispersed recreation would be unavailable for as long as the Parkway exists. Although there would be a loss in the capability of the project area to provide for (produce) grazing, agriculture, recreation, and utilities, the new transportation land use would provide safe transportation for residents, emergency services, and infrastructure maintenance.

4.11.12 Irreversible and Irretrievable Commitment of Resources

There would be an irreversible and irretrievable loss of approximately 220 to 392 acres of grazing, agricultural, and recreational land uses if the SVPP were implemented, due to the presence of a paved Parkway.

4.12 LIVESTOCK GRAZING

4.12.1 Analysis Area, Approach and Assumptions

Direct and indirect impacts to grazing management resulting from the SVPP are analyzed within the 250-foot-wide project ROW, as well as areas of allotments that would be separated by the SVPP. This area of analysis was selected to account for potential direct and indirect impacts to existing grazing management. Environmental consequences analyzed consider the compatibility of the alternatives with both existing grazing management and applicable planning documents governing the livestock grazing use of project lands. Cumulative impacts to grazing management are analyzed in the Beloat and Conley grazing allotments, discussed in Section 4.12.9. Impacts to grazing management will be determined by changes to the acres of forage available for livestock grazing and changes to livestock movement and/or access to the allotments, brought on by the implementation of the Proposed Action and/or the alternatives and sub-alternatives.

It is assumed that there would be no other use of the project area except for transportation. Impacts to grazing management in the area of analysis from the implementation of the SVPP are discussed in terms of changes to the existing use. BLM and ADOT road inventories were used to identify potential road crossings that would require cattle guards should the Proposed Action or other action alternatives be selected. Some existing roadways may not be identified in these inventories, such as illegal or user-created roads.

4.12.2 No Action

Under the No Action Alternative, the BLM land on which the project is proposed would continue to be managed under the existing conditions. BLM's framework for a program of multiple use and sustained yield would continue within the project area. The maintenance of environmental quality of public lands (43 USC 1781(b)) in conformance with applicable statutes, regulations, and the Lower Sonoran RMP (BLM 2012a) would continue. Current grazing management in the area of analysis would continue under the No Action Alternative; there would be no loss of grazing access to or acres of forage available for grazing on either of the allotments and the project area would be available to other uses that are consistent with the Lower Sonoran RMP.

Much of the project area is vacant land. Land in the immediate vicinity of the project area and alternatives would remain primarily open desert under the No Action Alternative. As discussed in Section 3.12, authorized grazing would continue on the Beloat and Conley grazing allotments in the project area.

4.12.3 Impacts Common to all Action Alternatives

The Proposed Action and action alternatives would effectively bisect the Beloat grazing allotment from the northwest to the southeast. Cattle would not be able to cross east to west or west to east as they currently are able to do. Cattle would not be able to freely cross the Parkway to the north because of Article 7-4 of the city code of the City of Goodyear, which prohibits animals roaming at large north of Patterson Avenue. Although the overall reduction of acres of grazing land is relatively small compared to the overall grazing allotment size, grazing productivity would decrease due to the inability of cattle to reach facilities such as reservoirs, stock tanks, corrals, and troughs on the opposite side of the Parkway. Because the Proposed Action and action alternative alignments are different, the number of facilities that would be located on either the east or west side of the Parkway would vary for each alternative, as described below. Livestock movement would also be restricted on the Conley alignment, albeit to a lesser extent since cattle currently do not travel north-south across SR 238.

The introduction of traffic associated with the construction and operation of the SVPP would increase the risk of injury or death to individual cattle through vehicle strikes, if cattle are grazing in the area. Fencing and cattle guards applied during construction and operation of the SVPP would help minimize hazards to cattle grazing near these portions of the allotments.

Because the 250-foot-wide project ROW would be the same for the two-, four-, or six-lane Parkway, the acreage of grazing allotments impacted by implementing the SVPP would be the same as described under the direct and indirect impacts of each alternative and sub-alternative. The proposed alignments of the action alternatives and sub-alternatives are not expected to affect current fencing alignments within either of the grazing allotments; however, if the Parkway alignment goes through a fence, BLM and the City will work with the grazing allottee to determine methods to minimize impacts to the allotment. Though existing fencing alignments are not anticipated to change, the addition of the ROW fencing will effectuate new fencing alignments on both sides of the ROW. The number of access roads and fence lines crossed by the alternative Parkway alignments would be the same as described under the direct and indirect impacts for each alternative and sub-alternative as well.

4.12.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.12.4.1 Grazing allotments

Under Alternative A, the BLM Preferred Alternative, site preparation would include the clearing of some natural vegetation from the project area. Because some vegetation would be removed and the area would be fenced, livestock would no longer be able to graze from vegetation communities associated with the SVPP project area. The total operational footprint of Alternative A would be 53.2 acres removed from livestock grazing as a result of fencing and grading the area. Specifically, 33.2 acres (0.002% of the total allotment acreage of 174,080 acres) of the Beloat allotment would be removed from livestock grazing use for the life of the SVPP. Twenty acres of the Conley allotment (0.002% of the total allotment acreage of 116,234 acres) would also be removed from livestock grazing use for the life of the SVPP. Implementation of Alternative A would slightly reduce the amount of acres of forage available for livestock grazing.

4.12.4.2 Livestock Movement

The proposed alignment of the SVPP under Alternative A is not expected to affect current fencing alignments within either of the grazing allotments; however, if the Parkway alignment goes through a fence, BLM and the City will work with the grazing allottee to determine methods to minimize impacts to the allotment. The proposed alignment under Alternative A would cross 11 access roads identified in the BLM road inventory and seven roads identified in the ADOT road inventory; these roads are typically two-track access roads to a cattle tank or a pipeline. Where the SVPP is proposed to cross these access roads, a cattle guard or gate must be installed, depending on the amount of traffic for each access, in order to keep cattle off the road while allowing grazing permittee and public user access.

As illustrated on Figure 3-17, three existing unfenced reservoirs, four fenced reservoirs, one well, and one corral would be located on the west side of the Parkway. Three existing unfenced reservoirs, three fenced reservoirs, six wells, one storage tank, and four corrals would be located on the east side of the Parkway.

4.12.5 Alternative C Direct and Indirect Impacts

Direct and indirect impacts to livestock grazing under Alternative C would be largely the same as under Alternative A, except as described below.

4.12.5.1 Grazing Allotments

The operational footprint of Alternative C would be 61.4 acres, which is 8.2 acres more than Alternative A. Alternative C would reduce acres available for grazing by 48.1 acres (0.002%) and 13.3 acres (0.001%) in the Beloat allotment and Conley allotment, respectively.

Unmitigated, BLM lands available for grazing included in the Conley allotment west of the Alternative C alignment would be lost (approximately 712 acres) since the Alternative C alignment would sever the existing pasture at this location. Since there are no existing livestock waters in this area, the pasture could not be used for forage. This represents less than 1% of the total BLM lands within the Conley allotment (91,018 acres). The loss of forage would be a long-term, adverse impact.

4.12.5.2 Livestock Movement

The proposed alignment under Alternative C would cross 29 roads identified in the BLM road inventory and nine roads identified in the ADOT road inventory. Where the SVPP is proposed to cross these access roads, a cattle guard or gate must be installed, depending on the amount of traffic for each access, in order to keep cattle off the road while allowing grazing permittee and public user access. As stated above, unmitigated, BLM lands available for grazing included in the Conley allotment west of the Alternative C alignment would be lost (approximately 712 acres) since the Alternative C alignment would sever the ability for livestock to move in and out of the existing pasture at this location. The loss of livestock movement ability would be a long-term, adverse impact.

As illustrated on Figure 3-17, three existing unfenced reservoirs, four fenced reservoirs, one well, and one corral would be located on the west side of the Parkway. Three existing unfenced reservoirs, three fenced reservoirs, six wells, one storage tank, and four corrals would be located on the east side of the Parkway.

4.12.6 Alternative H Direct and Indirect Impacts

Direct and indirect impacts to livestock grazing under Alternative H would be largely the same as under Alternative A, except as described below.

4.12.6.1 Grazing Allotments

The operational footprint of Alternative H would be 62.1 acres, which is 8.9 acres more than Alternative A. Alternative H would reduce acres available for grazing by of 42.5 acres (0.002%) and 19.6 acres (0.001%) in the Beloat allotment and Conley allotment, respectively.

4.12.6.2 Livestock Movement

The proposed alignment under Alternative H would cross 21 roads identified in the BLM road inventory and 10 roads identified in the ADOT road inventory. Where the SVPP is proposed to cross these access roads, a cattle guard or gate must be installed, depending on the amount of traffic for each access, in order to keep cattle off the road while allowing grazing permittee and public user access.

As illustrated on Figure 3-17, four unfenced reservoirs, five fenced reservoirs, one well, one storage tank, and two corrals would be located on the west side of the Parkway. One unfenced reservoir, two fenced reservoirs, six wells, and three corrals would be located on the east side of the Parkway.

4.12.7 Sub-alternative F Direct and Indirect Impacts

4.12.7.1 Grazing Allotments

The operational footprint of Sub-alternative F would be 10.8 acres wholly in the Conley allotment. This represents a reduction 0.001% of grazing land in the Conley allotment. Unmitigated, BLM lands available for grazing included in the Conley allotment west of the Sub-alternative F alignment would be lost (approximately 320 acres) since the Sub-alternative F alignment would sever the existing pasture at this location. Since there are no existing livestock waters in this area, the pasture could not be used for forage. This represents less than 0.5% of the total BLM lands within the Conley allotment (91,018 acres). The loss of forage would be a long-term, adverse impact.

4.12.7.2 Livestock Movement

The proposed alignment of the SVPP under Sub-alternative F is not expected to affect current fencing alignments within either of the grazing allotments; however, if the Parkway alignment goes through a fence, BLM and the City will work with the grazing allottee to determine methods to minimize impacts to the allotment. The proposed alignment under Sub-alternative F would cross one road identified in the BLM road inventory and four roads identified in the ADOT road inventory. Where the SVPP proposes to cross these access roads, a cattle guard or gate must be installed, depending on the amount of traffic for each access, in order to keep cattle off the road while allowing grazing permittee and public user access. As stated above, unmitigated, BLM lands available for grazing included in the Conley allotment west of the Sub-alternative F alignment would be lost (approximately 320 acres) since the Sub-alternative F alignment would prevent livestock from moving in and out of the existing pasture at this location. The loss of livestock movement ability would be a long-term, adverse impact.

4.12.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.12.8.1 Grazing Allotments

The operational footprint of Sub-alternative G would be 8.5 acres. This represents a reduction of 8.1 acres (0.001%) in the Conley allotment. Unmitigated, BLM lands available for grazing included in the Conley allotment west of the Sub-alternative G alignment would be lost (approximately 320 acres) since the Sub-alternative G alignment would sever the existing pasture at this location. Since there are no existing livestock waters in this area, the pasture could not be used for forage. This represents less than 0.5% of the total BLM lands within the Conley allotment (91,018 acres). The loss of forage would be a long-term, adverse impact.

4.12.8.2 Livestock Movement

The proposed alignment of the SVPP under Sub-alternative G is not expected to affect current fencing alignments within either of the grazing allotments; however, if the Parkway alignment goes through a fence, BLM and the City will work with the grazing allottee to determine methods to minimize impacts to the allotment. The proposed alignment under Sub-alternative G would cross three roads identified in the BLM road inventory and three roads identified in the ADOT road inventory. Where the SVPP proposes to cross these access roads, a cattle guard or gate must be installed, depending on the amount of traffic for each access, in order to keep cattle off the road while allowing grazing permittee and public user access. As stated above, unmitigated, BLM lands available for grazing included in the Conley allotment west of the Sub-alternative G alignment would be lost (approximately 320 acres) since the Sub-alternative G alignment would prevent livestock from moving in and out of the existing pasture at this location. The loss of livestock movement ability would be a long-term, adverse impact.

4.12.9 Additional Mitigation Measures

The following additional mitigation measures are suggested under all action alternatives and sub-alternatives:

- The entire ROW will be fenced with standard ROW barbed-wire fencing (as approved by BLM).

- The City of Goodyear shall reimburse the grazing permittee for the forage lost over a 50-year period, at the going rate per AUM. The amount of reimbursement depends upon the alternative selected.
- Cattle guards would be installed at the following locations/intersections for the Beloat allotment:
    - Rainbow Valley Road and Germann Road on the east side
    - Rainbow Valley Road and Queen Creek Road on both sides
    - Rainbow Valley Road and Ocotillo Road on both sides
    - Rainbow Valley Road and Riggs Road on both sides

The following additional mitigation measures are suggested if Alternative A, the BLM Preferred Alternative, is implemented:

- Any wildlife crossing intended for large mammals would be compatible for livestock.
- Gates would be installed at the following locations/intersections for the Beloat allotment:
    - Alternative A alignment and Patterson Road
    - Alternative A alignment and Bullard Avenue
    - Between the Patterson Road and Bullard Avenue gates on the east side
    - Near the intersection of the Alternative A alignment and the southern allotment boundary fence

The following additional mitigation measures are suggested if Alternative C is implemented:

- Any wildlife crossing intended for large mammals would be compatible for livestock.
- Relocate or compensate the Beloat allottee for shipping pens, Ranch Headquarters, corrals, well, dirt tanks, and pasture fence that would be lost.
- Provide livestock water at South Well on both sides of alignment for the Beloat allotment.
- Provide livestock water at Yonker Tank on both sides of alignment for the Beloat allotment.
- Gates would be installed at the following locations/intersections for the Beloat allotment:
    - Alternative C alignment and Patterson Road
    - Alternative C alignment at Yonker tank
    - Alternative C north and south of South Well

4.12.10 Residual Impacts

Residual impacts would include the permanent loss of access to forage within the proposed ROW and a change in cattle foraging habits where pasture boundaries and pathways to water sources are reconfigured (because water is a limiting factor on cattle movement). In addition, cattle foraging habits may be permanently altered by reconfigured pasture boundaries. This is because the grazing process is influenced by livestock's diet selection and the animals' physiological needs such as water or thermal regulation (e.g., shade) (Heitschmidt and Stuth 1991). The localized impact of grazing on vegetation and soils (i.e., livestock foraging) tends to dissipate with distance from points of concentration such as water

(Washington-Allen et al. 2004). Livestock would likely forage outward from reconfigured pasture boundaries, which would change the pattern of previous foraging and pathways to water sources.

Fencing of the proposed ROW would reduce the likelihood of impacts to cattle from vehicle strikes. Under all action alternatives and sub-alternatives, even with application of mitigation measures proposed in Section 3.12.9, the existing Beloat and Conley allotments would be reduced in size to accommodate the proposed SVPP.

4.12.11 Short-term Uses versus Long-term Productivity

Under all action alternatives, construction and operation of the SVPP would affect the long-term vegetation productivity of the project area via vegetation removal. The land with the 250-foot-wide ROW, as well as any isolated portions of the allotment that the alternative may create, would be unavailable for grazing for as long as the Parkway exists. Although there would be a loss in the capability of the project area to provide for (produce) grazing, the new transportation land use would provide safe transportation for residents, emergency services, and infrastructure maintenance.

4.12.12 Irreversible and Irretrievable Commitment of Resources

There would be an irretrievable loss of grazing land uses if the SVPP were implemented, due to the presence of a paved Parkway.

There be irreversible commitments to grazing management resources, because these areas are not expected to ever be reclaimed and revegetated; thus long-term productivity of grazing management will be negatively impacted. Implementation of any of the action alternatives would result in the irreversible and irretrievable loss of between 72 and 391.5 acres of allotments available for livestock grazing, and irreversible impacts consisting of livestock displacement and livestock disruption. Due to the direct, indirect, and cumulative impacts associated with the SVPP and the reasonably foreseeable actions associated with community development in the Goodyear, Mobile, and Maricopa areas, this project may cause an irreversible commitment of grazing resources through an irretrievable loss of land and available forage for livestock grazing.

4.13 RECREATION MANAGEMENT

4.13.1 Analysis Area, Approach and Assumptions

Direct and indirect impacts to recreation resulting from the SVPP are analyzed within the Rainbow Valley, including within the 250-foot-wide ROW. This area of analysis was selected to account for potential direct and indirect impacts to existing recreational conditions occurring within the 250-foot-wide ROW. Environmental effects analyzed consider the compatibility of the alternatives with existing recreation activities and settings governing the various types of recreational use of project lands. Impacts to recreation will be determined by potential changes to the type of recreational activities, the settings needed to support those activities, and desired recreational experience, brought on by the implementation of any of the project alternatives.

Cumulative impacts to recreation are analyzed in the Rainbow Valley area of analysis, discussed in Section 4.19.12.

The analysis area is any topographic point located in the adjacent recreation areas described in Section 3.13, Recreation Management. To assess changes to recreation opportunities resulting from the implementation of the SVPP, this analysis also utilizes information from the Visual Resources and Noise sections.

It is assumed for this analysis that the greater the degree of contrast, the more visible the SVPP will be on the landscape, and the greater the impact to the recreational activities, settings, and experiences. See Section 4.7 (Visual Resources) for more detailed information on visual resources analysis methodologies and results.

It is assumed that there would be no other use of the project area except for transportation. Impacts to recreation in the project area from implementation of the SVPP are discussed in terms of potential losses to the recreation experiences, settings, and opportunities that currently exist within the 250-foot-wide ROW.

4.13.2 No Action

Under the No Action Alternative, the BLM land on which the project is proposed would continue to be managed under the existing conditions. BLM's framework for a program of multiple use and sustained yield would continue within the project area. The maintenance of environmental quality of public lands (43 USC Section 1781(b)) in conformance with applicable statutes, regulations, and the Lower Sonoran RMP (BLM 2012a) would continue. Current recreational use and opportunities in the area of analysis described in Section 3.13 would continue under the No Action Alternative, and the project area would be available to other uses that are consistent with the Lower Sonoran RMP.

Much of the project area is undeveloped land. Land in the immediate vicinity of the project area would remain primarily open desert under the No Action Alternative. As discussed in Section 3.13, current recreational uses in the area of analysis include OHV driving, hunting, hiking, wildlife viewing, horseback riding, target shooting, camping, mountain biking, geocaching, picnicking, night-sky viewing, scenic driving, and photography.

4.13.3 Impacts Common to all Action Alternatives

4.13.3.1 Two-, Four-, and Six-lane Parkway

For some recreationists, the presence of and noise from construction equipment and its associated activities would detract from the recreation opportunity, experience, and setting. For others, the presence of equipment and construction activities would not detract from the recreation opportunity, experience and setting because it may attract interest.

All action alternatives would result in a direct loss of recreational settings and opportunities in the project area such as hunting, target shooting, OHV driving, and camping. These activities would be replaced by the single use of a transportation corridor (Parkway). Recreational use of the land in the project area during the lifespan of the SVPP ROW grant would be precluded.

In the areas designated for construction staging, safety zones would be established by fencing. These zones would preclude the area for hiking or other dispersed recreational activities currently occurring along the alignment.

Opportunities for dispersed recreation in the adjacent areas would be interrupted during construction of the SVPP due to changes in patterns of access caused by construction traffic. Increases in vehicular traffic on the roads and along utility corridors would deter or delay some recreationists from the area due to safety concerns, noise, and traffic congestion.

Noise from construction and operation of the SVPP is not likely to directly affect the visitor's experience in surrounding recreational areas, including the North Maricopa Mountains Wilderness and the Sierra Estrella Wilderness, SDNM, Buckeye Hills Regional Park, and Estrella Mountain Regional Park. The loudness and character of this noise, the times of day or night at which it is produced, and the proximity of the SVPP to noise-sensitive locations would diminish the natural quiet needed to support the recreational experience for a typical visitor seeking solitude. However, as visitors venture deeper into adjacent recreation areas and further from the project area, this noise intrusion would lessen and eventually cease. The effect on individual visitors would vary, depending on their desired recreation activity and experience and tolerance to the intrusion (refer to Section 4.16, Noise).

Although the operation and presence of a new Parkway in a previously inaccessible-to-passenger-vehicles area may attract some recreational users (sightseeing, wildlife viewing, and driving for pleasure), those seeking the common features for dispersed recreation opportunities would see change to the existing landscape resulting from the SVPP as a substantial modification. Public land would be available in the immediate vicinity for activities such as picnicking, OHV driving, wildlife viewing, interpretive use, vehicle camping, and other dispersed recreation activities; therefore these activities could continue in the analysis area and would offset the direct loss of land available for dispersed recreation. Indirect adverse impacts would occur to users in adjacent areas (e.g., SDNM) who seek opportunities for solitude or seek the limited light pollution required for recreation experiences such as night-sky viewing (BLM 2012b).

4.13.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.13.4.1 Two-lane Parkway

The removal of vegetation and construction of the SVPP in the project area would have an indirect impact on adjacent recreational users in the analysis area (e.g., users in SDNM) by altering the quality of the recreational setting on 474.8 acres. No impacts would occur to the recreation setting or opportunities in the lands managed by Maricopa County Parks and Recreation Department.

Under the Alternative A two-lane Parkway, approximately 84 acres would be lost to accommodate the operation and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation in the analysis area (public lands not designated as RMAs) by 0.36%, a negligible reduction.

4.13.4.2 Four-lane Parkway

Under the Alternative A four-lane Parkway, an additional approximately 167 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.03%, a negligible reduction.

4.13.4.3 Six-lane Parkway

Under the Alternative A six-lane Parkway, an additional approximately 220 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of

lands available for dispersed recreation (public lands not designated as RMAs) by 0.02%, a negligible reduction.

4.13.5 Alternative C Direct and Indirect Impacts

4.13.5.1 Two-lane Parkway

Impacts to recreation experience, settings, and opportunities from the construction and operation of the SVPP would be the same as described for Alternative A except as described below.

Under the Alternative C two-lane Parkway, approximately 97 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.04%, a negligible reduction.

4.13.5.2 Four-lane Parkway

Under the Alternative C four-lane Parkway, approximately 193 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.03%, a negligible reduction.

4.13.5.3 Six-lane Parkway

Under the Alternative C six-lane Parkway, approximately 255 acres of BLM land would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.02%, a negligible reduction.

4.13.6 Alternative H Direct and Indirect Impacts

4.13.6.1 Two-lane Parkway

Impacts to recreation experience, settings, and opportunities from the construction and operation of the SVPP would be the same as described for Alternative A except as described below.

Under the Alternative H two-lane Parkway, approximately 98 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.04%, a negligible reduction.

4.13.6.2 Four-lane Parkway

Under the Alternative H four-lane Parkway, approximately 195 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.02%, a negligible reduction.

4.13.6.3 Six-lane Parkway

Under the Alternative H six-lane Parkway, approximately 391 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.02%, a negligible reduction.

4.13.7 Sub-alternative F Direct and Indirect Impacts

4.13.7.1 Two-lane Parkway

Impacts to recreation experience, settings, and opportunities from the construction and operation of the SVPP would be the same as described for Alternative A except as described below.

Under the Sub-alternative F two-lane Parkway, approximately 17 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%, a negligible reduction.

4.13.7.2 Four-lane Parkway

Under the Sub-alternative F four-lane Parkway, approximately 34 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%, a negligible reduction.

4.13.7.3 Six-lane Parkway

Under the Sub-alternative F six-lane Parkway, approximately 97 acres of BLM land would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%, a negligible reduction.

4.13.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.13.8.1 Two-lane Parkway

Impacts to recreation experience, settings, and opportunities from the construction and operation of the SVPP would be the same as described for Alternative A except as described below.

Under the Sub-alternative G two-lane Parkway, approximately 13 acres of BLM land would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%, a negligible reduction.

4.13.8.2 Four-lane Parkway

Under the Sub-alternative G four-lane Parkway, approximately 25 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%, a negligible reduction.

4.13.8.3 Six-lane Parkway

Under the Sub-alternative G six-lane Parkway, approximately 72 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%, a negligible reduction.

4.13.9 Additional Mitigation Measures

When the initial two-lane highway is complete, the City would install permanent fencing and crossings, in accordance with BLM stipulations, as stated in Chapter 2. Mitigation measures discussed in Section 4.16 Noise, would also mitigate impacts to the recreation setting. Similarly, mitigation discussed in Section 4.2, Air Resources would mitigate impacts to the recreation setting.

The following mitigation measure would be implemented to reduce impacts to recreation during construction of the SVPP:

- Traffic control measures would be implemented on existing access roads adjacent to the project area during construction to direct traffic and ensure safe and continual access to the adjacent public lands.

4.13.10 Residual Impacts

Utilization of traffic control measures in areas where construction of the SVPP is adjacent to existing roads would reduce the risk of vehicle accidents and congestion and ensure continued access to recreation settings and opportunities on adjacent public and private lands during construction of the SVPP. Maintenance of access would ensure continued availability of public lands for recreation uses. Existing access to the public lands would continue.

There would be no further mitigation measures for recreation. Therefore, the remaining impacts would be the same as discussed under the alternatives.

4.13.11 Short-term Uses versus Long-term Productivity

Construction and operation of the SVPP would result in use of land for transportation rather than BLM's multi-use mandate, including recreation. Implementation of the project would eliminate recreational access and activities in the project area in three primary ways: elimination of access to dispersed recreation on between 84 to 98 acres during construction of the two-lane Parkway, elimination of access to dispersed recreation on between 167 to 195 acres during construction of the four-lane Parkway, and elimination of access to dispersed recreation on between 220 to 392 acres during construction of the six-lane Parkway. The elimination of access to dispersed recreation would result in long-term changes to dispersed recreation including hunting, target shooting, and motorized vehicle use patterns. Implementation of the SVPP would limit these types of desired recreational experiences at the project area.

4.13.12 Irreversible and Irretrievable Commitment of Resources

There would be irretrievable commitment of recreation resources because construction and operation of the SVPP would alter the scenery to a more developed setting, as viewed from within the adjacent recreation areas. This alteration would not be irreversible since the developed setting could someday be reclaimed to the current condition, though unlikely. There are no immediate plans with regards to the life of the SVPP and any subsequent reclamation plans, since the ROW permit would be permanent. Reclamation plans, if any, would be specified by the BLM in the terms of the ROW permit. If the SVPP were reclaimed, it could take many years before the SVPP footprint is no longer visible. This would be an

irretrievable change to the recreation setting and could result in the displacement of recreation users or alteration of their experiences and/or activities.

4.14 TRAVEL MANAGEMENT

4.14.1 Analysis Area, Approach and Assumptions

The area of analysis for travel management is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing travel management, when assessed in combination with the project and other cumulative actions, would be impacted if the SVPP were implemented. In this analysis, Rainbow Valley is defined as the Waterman Wash and Rainbow Wash watersheds, bounded generally by the Buckeye Hills and Gila River to the north, the Sierra Estrella Mountains to the east, and the Maricopa Mountains to the south and west. The analysis does not include an analysis of projected level of service and traffic volumes for the proposed SVPP. LOS and traffic volume of the current pipeline road is unavailable.

4.14.2 No Action

Under the No Action Alternative, the SVPP would not be developed, and the existing transportation and traffic patterns and infrastructure in and around the project area would remain unchanged. Generally, the project area and ROW are relatively inaccessible. Commuters to and from the greater Phoenix area are limited in viable options such as SR 238 to SR 347 (Maricopa Road) to I-10; or SR 85 to I-10. Recent population growth has resulted in increased traffic volumes that have significantly reduced the level of service on these existing roadways.

4.14.3 Impacts Common to all Action Alternatives

4.14.3.1 Two-lane Parkway

The addition of two lanes would provide access to/from southern Goodyear to Mobile and the Sonoran Valley. A new road would result in reduced traffic volumes on SR 238, SR 347 to I-10, and SR 85 to I-10. Change in level of service on these roads is not quantified in this analysis. However, the two-lane Parkway capacity would accommodate approximately 24,000 vehicles per day. In addition, construction of the two-lane Parkway is, in part, intended to relieve future increases in traffic volume due to residential and commercial development within the Sonoran Valley area and region.

Where the two-lane Parkway intersects existing BLM roads, existing legal public access would be retained. A gate or cattle guard would be installed at each BLM road intersection, washes that are identified as BLM roads notwithstanding.

4.14.3.2 Four-lane Parkway

The addition of four lanes would provide additional access to/from southern Goodyear to Mobile and the Sonoran Valley. Four lanes would result in additional reduction in traffic volumes on SR 238, SR 347 to I-10, and SR 85 to I-10. Change in level of service on these roads is not quantified in this analysis. However, operation of the four-lane Parkway would generally relieve future increases in traffic volume on the Sonoran Valley Parkway due to residential and commercial development within the Sonoran

Valley area and region. The four-lane Parkway capacity would accommodate approximately 48,000 vehicles per day.

Where the four-lane Parkway intersects existing BLM roads, existing legal public access would be retained. A gate or cattle guard would be installed at each BLM road intersection, washes that are identified as BLM roads notwithstanding.

4.14.3.3 Six-lane Parkway

The addition of six lanes represents build-out conditions of the Parkway and would provide additional vehicular access to/from southern Goodyear to Mobile and the Sonoran Valley. Six lanes would result in additional reduction in traffic volumes on SR 238, SR 347 to I-10, and SR 85 to I-10. Change in level of service on these roads is not quantified in this analysis. However, operation of the six-lane Parkway would generally relieve future increases in traffic volume on the Sonoran Valley Parkway due to residential and commercial development within the Sonoran Valley area and region. The six-lane Parkway capacity would accommodate approximately 72,000 vehicles per day.

Where the six-lane Parkway intersects existing BLM roads, existing legal public access would be retained. A gate or cattle guard would be installed at each BLM road intersection, washes that are identified as BLM roads notwithstanding.

4.14.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

The following is a discussion of potential impacts on existing transportation systems within an immediate vicinity (2 miles or less) of the proposed Parkway. The systems described include state highways, county roads, BLM roads, utility company roads, access roads, and other private roads in the SVPP study area.

4.14.4.1 State Highways

Alternative A would connect with SR 238 just west of 99th Avenue near the Mobile Elementary School (see Figure 3-24). During construction, traffic volume would increase along SR 238. At the peak of construction, construction-related vehicles would be commuting to and from the project area on a daily basis, and additional construction trucks per day would be making trips to and from the site. Once in operation, the proposed Parkway under Alternative A may continue to impact traffic volume on SR 238 as it is expected to increase from existing conditions as a result of greater access to the highway from the proposed Parkway (City 2006). However, traffic using SR 238 to make a connection to southern Goodyear or Mobile would likely be reduced, because the Parkway would now provide an alternative road, and a more direct route.

4.14.4.2 Maricopa County Roads

As previously stated in Section 3.14, the project area is located amongst a crudely developed network of existing county roads. Alternative A does not intersect most of these roads, with the exception of Riggs and Rainbow Valley Roads. Approximately 2.5 miles of Maricopa County roads would be upgraded for use for Alternative A as it would start at Riggs Road and head south along Rainbow Valley Road. Under this alternative, parts of Rainbow Valley Road also would be upgraded for use in the Parkway. During construction, access would be maintained for the public, however there may be temporary delays caused by construction-related traffic. Once the proposed Parkway is in operation under Alternative A, the use of

these roads would provide beneficial long-term impacts to motorists and residents in the area as access to and from Rainbow Valley would be greatly improved during operation.

4.14.4.3 BLM Roads

Under Alternative A, approximately 9 miles of the proposed Parkway would be located on BLM-administered lands (comprising 284 acres within the 250-foot-wide ROW and 1.4 acres in a temporary construction easement). During operation, the use of these roads for the proposed Parkway under Alternative A would provide beneficial long-term impacts to motorists and residents, as access to and from the area would be greatly improved during operation. Apart from short-term construction delays, the unpaved BLM roads would experience very little impact from the construction and operation of Alternative A.

The Alternative A alignment would provide mechanisms for BLM to control illegal OHV driving into the SDNM from the SVPP, primarily through the construction and maintenance of ROW fencing. Final design of the proposed Parkway would include design features for ROW fencing, curbing, and/or other vehicle barriers.

4.14.4.4 Utility Company Roads

As previously stated in Section 3.11, there is currently no direct, paved road link between the vicinity of Mobile and central Goodyear. As a result, some residents of Mobile, as well as others from outside of the community, have been using the unpaved EPNG pipeline maintenance road and Transwestern Pipeline and El Paso Transmission access roads to travel to and from Mobile as well as the greater Phoenix metropolitan area. Though this road is not currently gated or restrictive of public access, use of this road for the general public is discouraged for safety reasons. During construction, it is likely that motorists would continue to use the utility company roads while the proposed Parkway is constructed. Construction-related traffic is unlikely to affect these roads. Because Alternative A would parallel the EPNG pipeline maintenance road for approximately 10.4 miles, during operation, motorists would be less likely to continue using the unpaved utility road. This would serve to alleviate any safety concerns and significantly reduce continuing degradation of the EPNG pipeline maintenance road.

4.14.4.5 Other Private Roads

No known private roads intersect any of the project alternatives; therefore, there would be no impact on private roads under Alternative A.

4.14.4.6 Highways and Road Usage

Alternative A totals 15.7 miles, starting at Riggs Road at the north end, running south for approximately 2.5 miles along Rainbow Valley Road, then heading southeast roughly paralleling the EPNG pipeline maintenance road for 10.4 miles. The proposed Parkway under Alternative A would also allow for a direct paved road link between the vicinity of Mobile and central Goodyear, which would likely increase use of SR 238 and other adjacent roads that provide connection to/from the proposed Parkway. The ease of access to view the open desert and SDNM from the Parkway could increase the likelihood of driving for pleasure and/or casual exploration.

4.14.4.7 Traffic Volume

During construction, traffic volume within the project area, including SR 238, would increase slightly as a result of construction-related traffic. During operation, under Alternative A, traffic volume along SR 238,

as a result of the proposed Parkway, would continue to increase from those commuting to and from the greater Phoenix area (City 2006). Exact calculations of traffic volume changes are not available at this time. However, it is assumed that construction of the Parkway would provide increased access where it does not exist at the present; thus, increased traffic volumes would be assumed for adjacent connections to the Parkway as traffic use would be both local (accessing the Sonoran Valley) and regional (making a connection to other roadways).

4.14.4.8 Access

Access to the proposed Parkway from the north would be from Riggs Road to Rainbow Valley Road. From the south, access routes to the Parkway would be through SR 283. As previously mentioned, this would eliminate access to part of an authorized county route, Rainbow Valley Road, within the project's footprint. However, although there is minimal use of county roads under Alternative A, construction of the proposed Parkway would not greatly affect access to dispersed recreation in the area on BLM-administered lands as access would be maintained at all times. There may be construction-related traffic delays, particularly on sparsely used BLM roads that provide legal access to the SDNM, however these delays would be short-term.

During operations, improved access would serve as a beneficial long-term impact for residents of Goodyear, Mobile, and Maricopa. Such improved access would provide faster response times for emergency, police, and fire vehicles to access the area. As previously mentioned, existing legal public access would be retained.

4.14.4.9 Two-lane Parkway

The two-lane Parkway scenario for Alternative A would span 15.7 miles and provide a Parkway connection from southern Goodyear to Mobile. Construction would require a temporary easement of 1.4 acres as well as temporary disturbance of 39.4 acres as the two-lane Parkway is built. Long-term impacts of a two-lane Parkway in terms of travel management would be the addition of access in an area that currently has no viable roadways and is slated for population growth.

4.14.4.10 Four-lane Parkway

The four-lane Parkway scenario for Alternative A would span the same length as the two-lane Parkway scenario and would provide the same accessibility. Construction staging would require the same amount of temporary, short-term disturbance but staging and construction would occur in a different area within the ROW. Long-term impacts of the four-lane Parkway would be similar to the two-lane Parkway, however the four-lane Parkway would provide additional capacity and would accommodate added vehicular traffic.

4.14.4.11 Six-lane Parkway

The six-lane Parkway scenario for Alternative A would span the same length as the two-lane and four-lane Parkway scenarios and would provide the same accessibility. Construction staging would require the same amount of temporary, short-term disturbance but staging and construction would occur in a different area within the ROW. Long-term impacts of the six-lane Parkway would be similar to the two-lane and four-lane Parkway scenarios; however the six-lane Parkway would provide additional capacity and would accommodate added vehicular traffic.

4.14.5 Alternative C Direct and Indirect Impacts

The following is a discussion of potential impacts on existing transportation systems within an immediate vicinity (2 miles or less) of the proposed Parkway. The systems described include state highways, county roads, BLM roads, utility company roads, access roads, and other private roads in the SVPP study area.

4.14.5.1 State Highways

Under Alternative C, impacts to SR 238 would be the same as Alternative A.

4.14.5.2 Maricopa County Roads

Alternative C would have the greatest impact on county roads as approximately 8.8 miles of county roads would be converted to Parkway under this alternative, including parts of Rainbow Valley and Patterson Roads, and Bullard Avenue. Construction of Alternative C may have adverse short-term impacts on residents living along Patterson Road due to construction-related traffic delays. However, access to these roads would be maintained at all times. During operation, the use of county roads would provide long-term benefits to residents as emergency response vehicles and utility-related traffic would have better access to this area.

4.14.5.3 BLM Roads

Under Alternative C, a total of 18.1 miles of the proposed Parkway would be located on BLM-administered lands (comprising 548.5 acres within the 250-foot-wide ROW, with 319.4 acres being BLM-administered, and 1.4 acres in a temporary construction easement). This would amount to an increase of 34.8 acres on BLM lands from Alternative A. In addition, temporary impacts from construction of the proposed Parkway would be 45.4 acres (6 acres more than Alternative A). Impacts to unpaved BLM roads would be the same as described under Alternative A.

4.14.5.4 Utility Company Roads

Alternative C follows a different alignment that does not parallel the existing unpaved EPNG pipeline maintenance road (as opposed to Alternative A). Alternative C would not follow existing utility company roads.

4.14.5.5 Other Private Roads

No known private roads intersect any of the project alternatives; therefore, there would be no impact on private roads under Alternative C.

4.14.5.6 Highways and Road Usage

Alternative C measures 18.1 miles, starting at Riggs Road at the north end, running south for approximately 1.8 miles along Rainbow Valley Road, heading directly east along Patterson Road for approximately 4 miles, then south along the Bullard Avenue alignment for roughly 3 miles, and finally heading east and southeast for 5.4 miles. Under Alternative C, impacts on highway and road usage from construction and operation would be similar to Alternative A; however, portions of Alternative C run parallel to existing roads (i.e., Bullard Avenue, Rainbow Valley Road, Patterson Road), and therefore these roadway segments would be replaced by the proposed Parkway but traffic would be uninterrupted during construction to the extent possible.

4.14.5.7 Traffic Volume

Under Alternative C, impacts on traffic volume from construction and operation may include some effect to existing traffic on portions of Bullard Avenue, Rainbow Valley Road, and Patterson Road. However, low volumes of traffic currently exist on these roads and impacts from construction and operation of the proposed Parkway would likely be negligible. It is relevant to note that Alternative C is longer and more curvilinear than Alternative A, resulting in reduced travel times and a reduced posted speed limit (particularly at sharp turns) as compared to Alternative A.

4.14.5.8 Access

Under Alternative C, impacts to access from construction and operation would be the same as Alternative A, except as described below.

There may be construction-related traffic delays, particularly on sparsely used BLM roads that provide legal access to the Sierra Estrella Wilderness, however the impact would be short-term. Operational traffic of the SVPP is not anticipated to result in traffic delays to access BLM lands. Refer to Section 4.19, Cumulative Impacts for further analysis on future access.

4.14.5.9 Two-lane Parkway

The two-lane Parkway scenario for Alternative C would span 18.1 miles and provide a Parkway connection from southern Goodyear to Mobile via portions of existing roads to the east and south. Construction would require a temporary easement of 1.4 acres as well as temporary disturbance of 39.4 acres as the two-lane Parkway is built. Long-term impacts of a two-lane Parkway in terms of travel management would be the addition of access in an area that currently has no viable Parkways and is slated for population growth. Alternative C follows a curvilinear Parkway alignment that traverses existing road corridors, rural developed private land, and vacant State land from its terminus at Riggs Road to the north and its final connection at SR 238 to the south.

4.14.5.10 Four-lane Parkway

The four-lane Parkway scenario for Alternative C would be the same as the two-lane scenario, except would allow for added traffic capacity.

4.14.5.11 Six-lane Parkway

The six-lane Parkway scenario for Alternative C would be the same as the two- and four-lane scenarios, except would allow for added traffic capacity.

4.14.6 Alternative H Direct and Indirect Impacts

The following is a discussion of potential impacts on existing transportation systems within an immediate vicinity (2 miles or less) of the proposed Parkway. The systems described include state highways, county roads, BLM roads, utility company roads, access roads, and other private roads in the SVPP study area.

4.14.6.1 State Highways

Under Alternative H, impacts to SR 238 would be the same as Alternatives A and C.

4.14.6.2 Maricopa County Roads

Under the Alternative H scenario, approximately 5.5 miles of county roads would be impacted (Patterson Road). Construction of Alternative H may have adverse short-term impacts on residents living along Patterson Road due to construction-related traffic delays. However, access to these roads would be maintained at all times. During operation, the use of county roads would provide long-term benefits to residents as emergency response vehicles and utility-related traffic would have better access to this area.

4.14.6.3 BLM Roads

Under Alternative H, a total of 18.3 miles of the proposed Parkway is proposed (comprising 553.9 acres within the 250-foot-wide ROW, with 308.1 acres being BLM-administered, and 1.4 acres in a temporary construction easement). This would amount to an increase of disturbance on 79 acres as compared to Alternative A. Alternative H would have an increase of 41.9 acres of disturbance on State lands and an increase of 13.7 acres of disturbance on private lands. In addition, temporary impacts from construction of the proposed Parkway would be 45.7 acres (6.3 acres more than Alternative A). Impacts to unpaved BLM roads would be the same as described under Alternative A.

4.14.6.4 Utility Company Roads

Alternative H follows a different alignment that does not parallel the existing unpaved EPNG pipeline maintenance road. Alternative H would not follow existing utility company roads.

4.14.6.5 Other Private Roads

No known private roads intersect any of the project alternatives; therefore, there would be no impact on private roads under Alternative H.

4.14.6.6 Highways and Road Usage

Alternative H measures 18.3 miles, starting at Riggs Road at the north end, running south for approximately 1.8 miles along Rainbow Valley Road, heading directly east along Patterson Road for approximately 6 miles, then running south along unimproved land for roughly 5 miles, finally heading east and southeast for about 5.5 miles. Under Alternative H, impacts on highway and road usage from construction and operation would be similar to Alternative C, however Alternative H crosses more unimproved landscape.

4.14.6.7 Traffic Volume

Under Alternative H, impacts on traffic volume from construction and operation would be very limited, as only approximately 6 miles of an existing paved roadway is paralleled. Alternative H is the longest alternative and, similar to Alternative C, is curvilinear, causing reduced travel times and a reduced posted speed limit (particularly at sharp turns).

4.14.6.8 Access

Under Alternative H, impacts to access from construction and operation would be the same as under Alternative C.

4.14.6.9 Two-lane Parkway

The two-lane Parkway scenario for Alternative H would span 18.3 miles and provide a Parkway connection from southern Goodyear to Mobile via portions of existing roads to the east and south. Construction would require a temporary easement of 1.4 acres as well as temporary disturbance of 45.7 acres as the two-lane Parkway is built. Long-term impacts of a two-lane Parkway in terms of travel management would be the addition of access in an area that currently has no viable roadways and is slated for population growth. Alternative H follows a curvilinear Parkway alignment that traverses existing road corridors, rural developed private land, and vacant State land from its terminus at Riggs Road to the north and its final connection at SR 238 to the south.

4.14.6.10 Four-lane Parkway

The four-lane Parkway scenario for Alternative H would be the same as the two-lane scenario, except would allow for added traffic capacity.

4.14.6.11 Six-lane Parkway

The six-lane Parkway scenario for Alternative H would be the same as the two-lane scenario, except would allow for added traffic capacity.

4.14.7 Sub-alternative F Direct and Indirect Impacts

The following is a discussion of potential impacts on existing transportation systems within an immediate vicinity (2 miles or less) of the proposed Parkway. The systems described include state highways, county roads, BLM roads, utility company roads, access roads, and other private roads in the SVPP study area.

4.14.7.1 State Highways

Under Sub-alternative F, impacts to SR 238 would be the same as Alternative A.

4.14.7.2 Maricopa County Roads

Sub-alternative F is located entirely on vacant private land and follows the existing EPNG pipeline road to its southern terminus at SR 238. Sub-alternative F is approximately 2.8 miles long. Construction of Sub-alternative F will likely result in few construction- or operation-related impacts because the alignment is located within an existing, unpaved access road ROW.

4.14.7.3 BLM Roads

Sub-alternative F, totaling 2.8 miles of the proposed Parkway, does not include BLM land or BLM roads within the 250-foot-wide ROW.

4.14.7.4 Utility Company Roads

Sub-alternative F follows the existing unpaved EPNG pipeline maintenance road at its northernmost point to its terminus at SR 238.

4.14.7.5 Other Private Roads

No known private roads intersect any of the project alternatives; therefore, there would be no impact on private roads under Sub-alternative F.

4.14.7.6 Highways and Road Usage

Sub-alternative F measures 2.8 miles, starting at the EPNG pipeline road at its north end, and then running south along this alignment to make its final connection with SR 238. Under Sub-alternative F, impacts on highway and road usage from construction and operation would be negligible as no other existing roads or corridors are crossed.

4.14.7.7 Traffic Volume

Under Sub-alternative F, impacts on traffic volume from construction and operation would be negligible aside from potential temporary impacts during construction of a traffic interchange or intersection with SR 238.

4.14.7.8 Access

Under Sub-alternative F, impacts to access from construction and operation would be improved, since currently limited access exists in this area.

4.14.7.9 Two-lane Parkway

The two-lane Parkway scenario for Sub-alternative F would span just over 3 miles and provide a Parkway connection from the alternatives (listed above) to an endpoint at SR 238. Construction would require no temporary easements and would result in about 9.2 acres of temporary construction impacts. Long-term impacts of a two-lane Parkway in terms of travel management would be the addition of access in an area that currently has no viable roadways and is slated for population growth. Sub-alternative F follows a slightly curving alignment that traverses mainly unimproved landscape and a portion of an existing road corridor to its final connection at SR 238 to the south.

4.14.7.10 Four-lane Parkway

The four-lane Parkway scenario for Sub-alternative F would be the same as the two-lane scenario, except would allow for added traffic capacity.

4.14.7.11 Six-lane Parkway

The six-lane Parkway scenario for Sub-alternative F would be the same as the two- and four-lane scenarios, except would allow for added traffic capacity.

4.14.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

The following is a discussion of potential impacts on existing transportation systems within an immediate vicinity (2 miles or less) of the proposed Parkway. The systems described include state highways, county roads, BLM roads, utility company roads, access roads, and other private roads in the SVPP study area.

4.14.8.1 State Highways

Under Sub-alternative G, impacts to SR 238 would be the same as Sub-alternative F.

4.14.8.2 Maricopa County Roads

Sub-alternative G is located predominantly on vacant private land and follows about 0.5 mile of the existing 107th Avenue alignment to its southern terminus at SR 238. Sub-alternative G is approximately 2.4 miles long and does not cross BLM land. Construction of Sub-alternative G would likely result in few construction- or operation-related impacts as the alignment is located mostly on vacant lands. During operation, the use of 107th Avenue would be maintained.

4.14.8.3 BLM Roads

Sub-alternative G, totaling 2.4 miles of the proposed Parkway, would comprise 72 acres of private land within the 250-foot-wide ROW. One unpaved BLM road, the Butterfield Overland Stage Route would be intersected by Sub-alternative G. Existing legal public access would be retained.

4.14.8.4 Utility Company Roads

Sub-alternative G connects with the existing unpaved EPNG pipeline maintenance road at its northern terminus. Other than this intersection, Sub-alternative G would not follow existing utility company roads.

4.14.8.5 Other Private Roads

No known private roads intersect any of the project alternatives; therefore, there would be no impact on private roads under Sub-alternative G.

4.14.8.6 Highways and Road Usage

Sub-alternative G measures 2.4 miles, starting at the EPNG pipeline road on the north end, running south for approximately 2 miles through vacant private land, and heading south to the 107th Avenue alignment to make its final connection with SR 238. Under Sub-alternative G, impacts on highway and road usage from construction and operation would be minimal as only a short distance (0.5 mile) of the existing 107th Avenue is paralleled and no other existing roads or corridors are crossed.

4.14.8.7 Traffic Volume

Under Sub-alternative G, impacts on traffic volume from construction and operation would be negligible aside from potential temporary impacts during construction of a traffic interchange or intersection with SR 238.

4.14.8.8 Access

Under Sub-alternative G, impacts to access from construction and operation would be improved since currently no access exists in this area.

4.14.8.9 Two-lane Parkway

The two-lane Parkway scenario for Sub-alternative G would span about 2.4 miles and provide a Parkway connection from the alternatives (listed above) to an endpoint at SR 238. Construction would require no temporary easements and would result in about 7.2 acres of temporary construction impacts. Long-term impacts of a two-lane Parkway in terms of travel management would be the addition of access in an area that currently has no viable roadways and is slated for population growth. Sub-alternative G follows a slightly curving alignment that traverses unimproved landscape to its final connection at SR 238 to the south.

4.14.8.10 Four-lane Parkway

The four-lane Parkway scenario for Sub-alternative G would be the same as the two-lane scenario, except would allow for added traffic capacity.

4.14.8.11 Six-lane Parkway

The six-lane Parkway scenario for Alternative G would be the same as the two- and four-lane scenarios, except would allow for added traffic capacity.

4.14.9 Additional Mitigation Measures

No additional mitigation measures are recommended.

4.14.10 Residual Impacts

Because no additional mitigation measures are recommended the residual impacts to travel management would be the same as discussed under all action alternatives.

4.14.11 Short-term Uses versus Long-term Productivity

Under all action alternatives, travel management would be expanded from existing routes. The current transportation routes within the area do not present enough viable options for commuters to and from the Phoenix metropolitan area. Given existing levels of traffic congestion and use of unauthorized utility roads for commuting, new transportation uses would provide better means of transportation for residents, emergency services, and infrastructure maintenance. In addition, the Sonoran Valley Parkway has been identified in regional and local transportation plans as an important element of the transportation network and would provide both regional and local transportation connections.

4.14.12 Irreversible and Irretrievable Commitment of Resources

If the SVPP were implemented, there would be no irreversible and irretrievable commitment of resources of travel management resources, because existing access is currently open to the public. However, construction and operation of the Parkway, for any of the alternatives, would require the use of appropriate traffic crossings for pedestrians, bicyclists, and motorized vehicles. Therefore, in cases where the proposed Parkway would cross currently undeveloped lands, crossing of these lands would be restricted or require proper adherence to proper traffic and pedestrian safety standards.

4.15 SPECIAL DESIGNATIONS

4.15.1 Analysis Area, Approach and Assumptions

This section outlines the impacts to special designation areas from the implementation of any of the project alternatives. As discussed in Section 3.15, special designation areas considered in this analysis include: 1) the North and South Maricopa Mountains Wilderness areas, 2) Sierra Estrella Wilderness, 3) the SDNM, and 4) the Juan Bautista de Anza National Historic Trail. The wilderness areas are managed to maintain or enhance the natural character and vegetation communities, to provide opportunities for primitive recreation and solitude, and to provide habitat for a diversity of fauna (BLM 1995). SDNM is managed to protect biological, archaeological, and historical resources (Presidential Proclamation 7397). The impacts to the historic trail are discussed in Section 4.3, Cultural and Heritage Resources.

These special designations discussed in Chapter 3 lie outside of the immediate project area footprint (the historic trail notwithstanding); however, they would be subject to indirect and cumulative impacts from changes to the existing viewshed, increases in noise, changes in access, and impacts to wildlife from activities associated with construction and operation of the SVPP. Impacts from noise are evaluated in terms of whether they would increase the ambient noise environment, and thus impact a visitor's recreation experience. Impacts to special designation's recreation characteristics are evaluated in terms of whether there would be a change in opportunities for solitude and primitive recreation, a change in the ability of the visitor to access the SDNM or wilderness areas, a change to the current vegetation communities, and changes to the natural or undeveloped character of the landscape. To assess these changes, this analysis utilizes information from the noise, wildlife, and visual sections of this chapter. As described in Chapter 3, the analysis area for special designations is not a defined polygon but rather any topographic point within the wilderness areas or SDNM where sights or sounds from the SVPP may be experienced by a visitor.

Cumulative impacts to special designation areas are analyzed in the Rainbow Valley analysis area, discussed in Section 4.19.14. It is assumed that there would be no other use of the SVPP, except for transportation.

4.15.2 No Action

Under the No Action Alternative, the SVPP would not be developed and the existing conditions of the special designation areas would continue. The landscape and existing roads and trails surrounding the analysis area would not be altered, and no changes to the viewshed or soundscape would occur. There would be no new barriers to wildlife movement or planned increases in vehicle traffic. Unsafe travel conditions along pipeline roads would continue to deteriorate and safety hazards would be increased. Management and current conditions of the special designations would remain unchanged.

Under the No Action Alternative, the past, present, and reasonably foreseeable future land uses would have the same cumulative effect on special designation values as described under the action alternatives, except that the SVPP would not be constructed. Continuation of existing uses would not result in any major changes to special designation area values.

4.15.3 Impacts Common to all Action Alternatives

4.15.3.1 Two-lane Parkway

Sonoran Desert National Monument

Conversion of the existing landscape from a natural setting to a high-contrast transportation corridor would have long-term adverse impacts to recreation opportunities and users of the adjacent areas of the SDNM. The impact would be limited to the areas of SDNM immediately adjacent to the alternative alignment, where the sights and sounds of the alternative alignment would change the existing viewshed and affect the solitude of SDNM (further discussed in Section 4.7, Visual Resources and Section 4.13, Recreation Management).

The color contrast the alternative alignments would impose upon the landscape during construction, operation, and maintenance would be highly noticeable throughout the day and the same throughout the year. Depending upon the engineering designs, the lights required for the SVPP at night would be noticeable; however, as stated in Chapter 2, all surface lighting would be designed to be in keeping with the Maricopa County Dark Sky Ordinance as stated in Section 1112 of the Maricopa County Zoning Ordinance (Maricopa County 2012) and Article 10 of the City of Goodyear's Zoning Ordinance (City 1999). Though these ordinances do not eliminate impacts to night skies, the ordinances would minimize the impacts and contrasts the alternative alignments would impose upon the landscape at night. This would have an adverse impact on the recreation setting and experience of SDNM immediately adjacent to the alternative alignments and from mountain peaks with expansive vistas, because all action alternatives would alter the view of Rainbow Valley from a mostly natural, rural setting to a more developed rural setting.

Under all action alternatives, including Alternative A, there would be an increase of traffic in the local area during the construction and operation of the SVPP. Traffic would come primarily from Rainbow Valley Road and SR 238. This increase in traffic would cause both short-term and long-term adverse impacts to SDNM wildlife because of vehicle strikes and barriers to movement. Traffic would increase the risk of wildlife mortality and would contribute to the fragmentation of wildlife populations. There would also be adverse impacts to the recreational setting and experience due to the increase in traffic.

Designated Wilderness Areas

The North and South Maricopa Mountain Wilderness would experience the same impacts as described above for SDNM, under all action alternatives, since the wilderness areas would experience the same indirect impacts to the viewsheds and recreational settings and desired experiences that would indirectly impact SDNM.

Because the Sierra Estrella Wilderness is 10 miles to the east of the proposed SVPP, this distance would reduce the effects of the view, and it is expected that the proposed Parkway would not stand out from the existing development in the area. Topography would also mitigate or eliminate (block) these effects in portions of the adjacent and nearby wilderness areas. The construction and operation of the SVPP under all action alternatives would create noise. The increase in construction-related noise would be noticeable from the northern and easternmost reaches of the North Maricopa Wilderness; however, the sound would quickly fade as visitors venture further into the wilderness.

Lower Gila Terraces and Historic Trails ACEC

Under all action alternatives and sub-alternatives, the proposed SVPP 250-foot ROW would intersect the Lower Gila Terraces and Historic Trails ACEC between approximately 2.0 and 2.8 miles (approximately 61–82 acres). The areas of the ACEC where the proposed SVPP 250-foot ROW would intersect currently include existing dirt roads, transmission lines and gas pipelines. All action alternatives and sub-alternatives would occur within the ACEC wholly on private lands. Private and non-federal lands within ACECs are not subject to the prescribed management of the ACEC (BLM 2012a).

The overall values for which the 82,500-acre ACEC was designated (cultural, archaeological, and Historic Trails) would not be lost if the SVPP were implemented; however, the conversion of the ACEC from the existing uses (including but not limited to dispersed recreation and livestock grazing) to a Parkway would adversely impact these values for between approximately 61 and 82 acres of the ACEC, which is less than approximately 0.1% of the entire ACEC.

The 2012 Lower Sonoran RMP (BLM 2012a) specifies in AC-1.1.13 that "Motorized vehicle routes that conflict with the values in the Importance and Relevance descriptions will be closed, limited, or mitigated. New route construction will not be allowed except as needed for resource protection, public safety, emergency, or other administrative uses, as determined by the authorized officer." As specified in Section 4.3, Cultural and Heritage Resources, the alternative and/or sub-alternative that is chosen by the BLM decision maker will be mitigated (either by data collection or to-be-determined design features) to reduce the impacts to the ACEC.

4.15.3.2 Four-lane Parkway

Sonoran Desert National Monument

Further conversion to the landscape from the construction the proposed four-lane Parkway would have long-term adverse impacts to recreation opportunities and users of the adjacent areas of the SDNM. The impact would present the same amount of contrast as the two-lane Parkway since the four-lane would effectively mirror the two-lane construction, except on the opposite side of the ROW. The effects of this expansion would be the same as described under the two-lane Parkway.

Designated Wilderness Areas

The effects of the four-lane Parkway expansion to designated wilderness areas would be the same as described under the two-lane Parkway.

Lower Gila Terraces and Historic Trails ACEC

The effects of the four-lane Parkway expansion to the Lower Gila Terraces and Historic Trails ACEC would be the same as described under the two-lane Parkway.

4.15.3.3 Six-lane Parkway

Sonoran Desert National Monument

Further conversion to the landscape from the construction of the proposed six-lane Parkway would have long-term adverse impacts to recreation opportunities and users of the adjacent areas of the SDNM. The impact would not present the amount of contrast as the two-lane Parkway, since the six-lane would include Parkway expansion and not new Parkway construction. The effects of this expansion would be the same as described under the two-lane Parkway.

Designated Wilderness Areas

The effects of the six-lane Parkway expansion to designated wilderness areas would be the same as described under the two-lane Parkway.

Lower Gila Terraces and Historic Trails ACEC

The effects of the six-lane Parkway expansion to the Lower Gila Terraces and Historic Trails ACEC would be the same as described under the two-lane Parkway.

4.15.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.15.4.1 Two-lane Parkway

Sonoran Desert National Monument

Under Alternative A, approximately 84 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP. The SVPP would introduce a 15.7-mile-long transportation corridor to the landscape in Rainbow Valley. Alternative A would occur approximately 800 feet to the east of the SDNM boundary, within the existing EPNG multi-use utility corridor. There would be no change to the landscapes or settings within SDNM; however, the presence (views) of the SVPP would degrade the primitive experience and solitude that visitors seek when visiting the nearby SDNM. These views would be most apparent from locations close to SVPP and from mountain peaks with expansive vistas. According to the Section 4.7 Visual Resources, the project footprint would be visible from certain portions of SDNM (see Figure 3-10). There are no access points, trailheads, or designated sites within SDNM that would be directly impacted as a result of Alternative A.

The entire view from areas of SDNM immediately adjacent to Alternative A and from mountain peaks with expansive vistas already includes views of residential areas, industrial sites, and utility corridors. The removal of vegetation and the conversion of the Alternative A alignment from a mostly natural setting to a Parkway would have long-term adverse impacts to the wildlife of SDNM because it would reduce the amount of forage and habitat that would be accessible for species that travel from SDNM to adjacent land areas (see Section 4.10, Wildlife). There would be no impacts to the habitat or forage within the SDNM.

The construction and operation of the SVPP would create noise in site-specific locations. The increase in construction-related noise would be noticeable from the northern and easternmost reaches of the SDNM. However, the sound would quickly fade as visitors venture further west into the SDNM. This would cause adverse impacts to the recreational setting and experience for visitors seeking solitude and primitive recreation opportunities. Construction of the SVPP under Alternative A would cause short-term and long-term impacts to wildlife moving between SDNM and the adjacent areas because the Parkway would create a barrier to wildlife movement. There would be no impacts to wildlife movements within SDNM.

Operation of Alternative A would impact 83.6 acres of BLM land adjacent to SDNM to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative A would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative A, two-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.4.2 Four-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Alternative A, four-lane Parkway would be the same as described in Section 4.15.3.1 except that under Alternative A, 206.5 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative A would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative A, four-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.4.3 Six-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Alternative A, six-lane Parkway would be the same as described in Section 4.15.3.1 except that under Alternative A, 514.2 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative A would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative A, six-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.5 Alternative C Direct and Indirect Impacts

4.15.5.1 Two-lane Parkway

Alternative C's direct and indirect impacts to special designations would be similar to those described under Alternative A, except that under Alternative C, 141.9 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP. Impacts under Alternative C would be the same as under Alternative A because the SVPP would convert open desert to a paved Parkway. The project footprint would still be visible from the special designation areas, and increases in vehicle presence and easier access to the lands adjacent to special designations would still occur. This would have adverse

impacts to the scenic quality of the landscape, recreation opportunities, and to wildlife, as discussed under Alternative A.

4.15.5.2 Four-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Alternative C, four-lane Parkway would be the same as described in Section 4.15.3.1 except that under Alternative C, 238.5 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative C would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative C, four-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.5.3 Six-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Alternative C, six-lane Parkway would be the same as described in Section 4.15.3.1 except that under Alternative C, 593.9 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative C would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative C, six-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.6 Alternative H Direct and Indirect Impacts

4.15.6.1 Two-lane Parkway

Sonoran Desert National Monument

Alternative H's direct and indirect impacts to special designations would be similar as described under Alternative A, except that under Alternative H, 143.2 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of SVPP. Impacts under Alternative H would be the same as under Alternative A because the SVPP would convert open desert to a paved Parkway. The project footprint would still be visible from the special designation areas, and increases in vehicle presence and easier access to the lands adjacent to special designations would still occur. This would have adverse

impacts to the scenic quality of the landscape, recreation opportunities, and to wildlife, as discussed under Alternative A.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative H would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative H, two-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.6.2 Four-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Alternative H, four-lane Parkway would be the same as described in Section 4.15.3.1 except that under Alternative H, 240.8 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative H would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative H, four-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.6.3 Six-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Alternative H, six-lane Parkway would be the same as described in Section 4.15.3.1 except that under Alternative H, 437.2 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative H would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative H, six-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.7 Sub-alternative F Direct and Indirect Impacts

4.15.7.1 Two-lane Parkway

Sonoran Desert National Monument

Sub-alternative F's direct and indirect impacts to special designations would be similar to those described under Alternative A, except that under Sub-alternative F, 26.2 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP. Impacts under Sub-alternative F would be the same as under Alternative A because the SVPP would convert open desert to a paved Parkway. The project footprint would still be visible from the special designation areas, and increases in vehicle presence and easier access to the lands adjacent to special designations would still occur. This would have adverse impacts to the scenic quality of the landscape, recreation opportunities, and to wildlife, as discussed under Section 4.15.3.1, Impacts Common to all Action Alternatives.

Designated Wilderness Areas

Impacts to designated wilderness areas under Sub-alternative F would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Sub-alternative F, two-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.7.2 Four-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Sub-alternative F, four-lane Parkway would be the same as described in Section 4.15.3.1 except that under Sub-alternative F, 43.3 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Sub-alternative F would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Sub-alternative F, four-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.7.3 Six-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Sub-alternative F, six-lane Parkway would be the same as described in Section 4.15.3.1 except that under Sub-alternative F, 43.3 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Sub-alternative F would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Sub-alternative F, six-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.15.8.1 Two-lane Parkway

Sonoran Desert National Monument

Sub-alternative G's direct and indirect impacts to special designations would be similar to those described under Alternative A, except that under Sub-alternative G, 19.9 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP. Impacts under Sub-alternative G would be the same as under Alternative A because the SVPP would convert open desert to a paved Parkway. The project footprint would still be visible from the special designation areas, and increases in vehicle presence and easier access to the lands adjacent to special designations would still occur. This would have adverse impacts to the scenic quality of the landscape, recreation opportunities, and to wildlife, as discussed under Section 4.15.3.1, Impacts Common to all Action Alternatives.

Designated Wilderness Areas

Impacts to designated wilderness areas under Sub-alternative G would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Sub-alternative G, two-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.8.2 Four-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Sub-alternative G, four-lane Parkway would be the same as described in Section 4.15.3.1 except that under Sub-alternative G, 32.5 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Sub-alternative G would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Sub-alternative G, four-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.8.3 Six-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Sub-alternative G, six-lane Parkway would be the same as described in Section 4.15.3.1 except that under Sub-alternative G, 79.2 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Sub-alternative G would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Sub-alternative G, six-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.9 Additional Mitigation Measures

To meet the objective of protecting the biological resources in the SDNM, additional mitigation measures could be implemented to protect wildlife from vehicle strikes and from loss of habitat connectivity. These measures are discussed in Section 4.10, Wildlife. Additional measures to mitigate visual and noise impacts are described in those respective sections (see Sections 4.7 and 4.16).

4.15.10 Residual Impacts

Residual impacts to special designations refer to any adverse impacts that remain after mitigation measures have been applied.

Residual impacts to the wildlife within special designations would include the long-term removal of breeding, foraging, and cover habitat in all areas occupied by the SVPP.

Regardless of the alternative selected, certain views during the construction period would be altered by the presence of construction vehicles, equipment personnel, and emerging new highway facilities. This impact (as well as construction noise) is expected to be considered adverse by some viewers and is an unavoidable consequence of project construction.

Please see Section 4.10 for a discussion of residual impacts to wildlife. Visual and noise residual impacts are discussed in Sections 4.7 and 4.16, respectively.

4.15.11 Short-term Uses versus Long-term Productivity

Implementation of the SVPP would create short-term and long-term changes to the scenic quality of the landscape and would create barriers to wildlife movement and loss of habitat. These impacts would have

an indirect impact on the human uses in special designation areas because the sight, presence, and use of the new Parkway would impact the recreational setting and experience, both beneficially and adversely. The beneficial indirect impacts would include easier access to the special designations located within the relatively remote Rainbow Valley. The adverse indirect impacts would include development of open desert and potential conflicts to primitive and semi-primitive recreational settings.

4.15.12 Irreversible and Irretrievable Commitment of Resources

There would be an irretrievable loss of grazing, agricultural, and recreational land uses if SVPP were implemented due to the presence of a paved Parkway. In addition, the SVPP would have an irretrievable adverse impact on wildlife and the recreation setting and experience (e.g., solitude, quiet, unobstructed views) in the adjacent special designation areas.

4.16 NOISE

4.16.1 Analysis Area, Approach and Assumptions

Direct and indirect impacts to existing noise levels resulting from the SVPP are analyzed along the 250-foot-wide project ROW. This area of analysis was selected to account for potential direct and indirect impacts to FHWA-defined Category B land uses, which include homes, churches, schools, and parks, in the project area. The environmental consequences analyzed consider the compatibility of the alternatives with both existing Category B land uses and applicable planning documents governing the use of project lands as they relate to these uses. Cumulative impacts to Category B land uses are analyzed in the Sonoran Valley Planning Area, defined in the City General Plan Amendment (City 2007).

It is assumed that no uses other than transportation are planned in the project area. Impacts to Category B land uses within the bounds of the analysis from implementation of the SVPP are discussed in terms of the potential to increase the peak hour equivalent traffic noise levels above the noise level criteria of 64 dBA as defined in the Zoning Ordinance, Article 9 Special Districts (City 2006). Article 9 Special Districts are defined as “areas that, due to the unique nature of the area (including but not limited to areas adjacent to freeways, city centers, or rural residential areas), surrounding land uses and/or physical improvements or natural features, require special regulations and approval process above and beyond the regulations and approval process of the underlying zoning districts” (City 2006).

4.16.2 No Action

The No Action Alternative assumes that none of the transportation improvements identified in the Goodyear Major Plan Amendment, including the widening of SR 238 and the expansion of the local roadway network, would occur and the existing segmented network of unpaved roadways would remain and the rural character of the project area would be preserved. Dispersed outdoor recreation including the use of OHVs would remain unchanged.

Existing noise levels would not be affected, because local traffic would continue to use the unpaved roadway network and there would be no construction of the SVPP.

4.16.3 Impacts Common to all Action Alternatives

The 250-foot-wide ROW is the same for each alternative (Alternatives, A, C, and H, and Sub-alternatives F and G) and Parkway (two-lane, four-lane, and six-lane) analyzed and includes a 25-foot-wide drainage easements on both sides. The Parkway design speed is 65 mph and the posted speed limit would be 55 mph for all analyzed proposed alternatives and Parkway designs.

The noise level impact determination used in this analysis is based on the ADOT Noise Abatement Policy (NAP), dated July 13, 2011 (and subsequent updates). The ADOT NAP complies with the FHWA Noise Abatement Criteria (NAC). The FHWA NAC specifies hourly noise level (L_{eq1h}) impact thresholds for different categories of land uses and activities. The L_{eq1h} impact threshold for Category B land use, which includes residences, churches, schools, and parks, is 67 dBA. The ADOT NAP determines the noise level impact for Category B land uses when the noise level approaches within 3 dBA of the FHWA NAC impacted hourly noise level, or 64 dBA. ADOT also considers mitigation if the noise level from the transportation improvement project is predicted to increase substantially. A substantial noise level increase is equal to or greater than 15 dBA.

The FHWA Category B land uses located within the noise analysis area include 44 detached single-family residences and/or mobile homes and one school (Mobile Elementary), which is located at the northeast corner of SR 238 and 99th Avenue. An undeveloped plat for Tangier Acres is located approximately 0.5 mile north of the school.

The planned posted speed for the SVPP is 55 mph. Traffic noise is most dominant during peak traffic hour or LOS C number of vehicles traveling at the posted speed. Based on the planned posted speed limit of 55 mph, the peak traffic hour traffic volume would be 1,400 vehicles per lane, based on the upper limit for low-volume multilane highway from the Highway Capacity Manual 2000 (Transportation Research Board 2000).

Medium and heavy trucks are assumed to operate on the Parkway. Medium trucks are categorized as vehicles having two axles and six wheels designed for the transportation of cargo. The gross weight of a medium truck is greater than 10,000 pounds but less than 26,400 pounds, and heavy trucks are categorized as vehicles having three or more axles and designed for the transportation of cargo, with gross weight greater than 26,400 pounds, as defined in the FHWA TNM Technical Manual (FHWA 1998). For the noise assessment, it is estimated that 3% of the vehicles are medium trucks and 2% of the vehicles are heavy trucks.

Noise levels from vehicle traffic for each of the designed SVPP alternatives were estimated using the Washington State Department of Transportation (WSDOT) typical noise levels for traffic volumes at a given speed (WSDOT 2011:Table 7-3). The Parkway design speed of 65 mph was used to estimate the sound level in dBA at 50 feet from the Parkway from the WSDOT traffic volume tabulated values. For this assessment, soft site reduction of 4.5 dB per doubling of distance was used.

4.16.3.1 Two-lane Parkway

A two-lane road is proposed with a total Parkway width of 44 feet, which includes a 28-foot-wide paved surface with 8-foot-wide graded shoulders. Based on a peak traffic hour volume of approximately 2,800 vehicles, traffic noise levels at approximately 50 feet from the Parkway are estimated at 77.4 dBA. A distance of approximately 389 feet from the Parkway is necessary to attenuate traffic noise levels to below 64 dBA.

4.16.3.2 Four-lane Parkway

For the expansion of the two-lane Parkway into the four-lane Parkway, the Parkway would have a total Parkway width of 200 feet, including a 112-foot-wide median separating two 28-foot-wide paved surfaces with 8-foot-wide graded shoulders. Based on a peak traffic hour volume of approximately 5,600 vehicles, traffic noise levels at approximately 50 feet from the Parkway are estimated at 80.4 dBA. A distance of approximately 618 feet from the Parkway is necessary to attenuate traffic noise levels to below 64 dBA.

4.16.3.3 Six-lane Parkway

If the four-lane Parkway is later expanded into a six-lane Parkway, the total Parkway width would be 200 feet, which includes an 84-foot-wide median separating two 42-foot-wide paved surfaces with 8-foot-wide graded shoulders. Based on a peak traffic hour volume of approximately 8,400 vehicles, traffic noise levels at approximately 50 feet from the Parkway are estimated at 82.2 dBA. A distance of approximately 809 feet from the Parkway is necessary to attenuate traffic noise levels to below 64 dBA.

Since noise levels would be the primary direct impact of the SVPP, the relative impacts of each of the alternatives (A, C, and H) and sub-alternatives (F and G) were analyzed by comparing the closest receptors and type. Table 4-35 presents the potential impacts by receptor for each alternative and sub-alternative.

Table 4-35. Impacts to FHWA-defined Category B Land Uses from the SVPP Alternatives

Affected Land Use Type	Closest Receptor Location by Type and Potential Impacts									
	Alternative A (BLM Preferred Alternative)		Alternative C		Alternative H		Sub-alternative F		Sub-alternative G (BLM Preferred Sub-alternative)	
Residential	**No.**	**Location**	**No.**	**Location**	**No.**	**Location**	**No.**	**Location**	**No.**	**Location**
Detached single-family homes and mobile homes	1	2,800 feet	16	At ROW	2	At ROW	1	At ROW	1	7,500 feet
Schools	1	2,400 feet	1	2,400 feet	1	2,400 feet	1	1,400 feet	1	6,000 feet
Outdoor Recreation (hunting, target shooting, backcountry driving, mountain biking, natural and cultural resources study, and sightseeing)	Various	Locations throughout project area. Activities occurring within the SDNM bordered by a 9.2-mile segment of SVPP.	Various	Locations throughout project area including SDNM	Various	Locations throughout project area including SDNM	Various	Locations throughout project area including SDNM	Various	Locations throughout project area including SDNM
Impact Summary	Existing noise levels between 40 and 62 dBA. Future peak hour noise level increase above existing < 15 dBA. Future peak hour noise levels below 64 dBA.									

4.16.4 Alternative A, BLM Preferred Alternative, Direct and Indirect Impacts

The closest residential unit to Alternative A is approximately 2,800 feet, and the closest school is approximately 2,400 feet. Based on these assumptions, the noise levels at 2,400 and 2,800 feet are anticipated to be less than 64 dBA for all Parkway designs (two-, four-, and six-lane). Due to the distance of potentially sensitive receptors from the Parkway, it is anticipated that the increase in noise levels from existing noise levels is less than 15 dBA. The impact on noise levels for potentially sensitive receptors would therefore be long-term but negligible.

The operation of Alternative A may result in indirect impacts to Category B land uses if the Parkway creates land use amendments brought on by development interest. Future development would increase the proximity of Category B land uses to the improved Parkway network in the project area.

4.16.5 Alternative C Direct and Indirect Impacts

The impacts to existing Category B land uses under Alternative C would be the same as described for Alternative A for all Parkway designs (two-, four-, and six-lane) except for a residential unit that would be approximately at the ROW. The noise level is anticipated to exceed 64 dBA with a greater than 15 dBA noise level increase from existing noise levels for this residential unit. The implementation of Alternative C would therefore result in long-term, adverse impact to noise levels for potentially sensitive receptors located along the ROW, and long-term, negligible impact to noise levels for potentially sensitive receptors not located along the ROW.

As with Alternative A, the future development from the operation of Alternative C would increase the proximity of receptors to the improved roadway network in the project area, resulting in indirect impacts to planned Category B land uses.

4.16.6 Alternative H Direct and Indirect Impacts

The impacts to existing Category B land uses under Alternative H would be the same as described for Alternatives A and C for all Parkway designs (two-, four-, and six-lane) except for residences located approximately at the ROW. The noise level is anticipated to exceed 64 dBA with a greater than 15 dBA noise level increase from existing levels for these residential units. The implementation of Alternative H would therefore result in long-term, adverse impact to noise levels for potentially sensitive receptors located along the ROW, and long-term, negligible impact to noise levels for potentially sensitive receptors not located along the ROW.

Alternative H's indirect impacts from future land uses would be the same as described for Alternatives A and C.

4.16.7 Sub-alternative F Direct and Indirect Impacts

The closest residential unit to Sub-alternative F is located approximately at the ROW. Therefore, under all Parkway designs (two-, four-, and six-lane), the noise level is anticipated to exceed 64 dBA with a greater than 15 dBA noise level increase from background for this residential unit. Sub-alternative F would also move the Parkway to a distance of approximately 1,400 feet from the school. However, the noise level from the Parkway at this distance is still anticipated to be less than 64 dBA for the school, with a less than 15 dBA noise level increase from existing levels. The implementation of Sub-alternative F would

therefore result in long-term, adverse impact to noise levels for potentially sensitive receptors located along the ROW, and long-term, negligible impact to noise levels for potentially sensitive receptors not located along the ROW.

Sub-alternative F's indirect impacts from future land uses would be the same as described for Alternatives A, C, and H.

4.16.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

The closest residential unit to Sub-alternative G, the BLM Preferred Sub-alternative, is approximately 7,500 feet, and the closest school is approximately 6,000 feet. Based on these assumptions, the noise levels at these distances are anticipated to be less than 64 dBA for all Parkway designs (two-, four-, and six-lane). Due to the distance of potentially sensitive receptors from the Parkway, it is anticipated that the increase in noise levels from existing noise levels would be less than 15 dBA. The impact on noise levels for potentially sensitive receptors would therefore be long-term but negligible.

Sub-alternative G's indirect impacts from future land uses would be the same as described for Alternatives A, C, and H and Sub-alternative F.

4.16.9 Additional Mitigation Measures

The Zoning Ordinance, Article 9 Special Districts (City 2006) contains language found in the ADOT NAP regarding noise minimum noise reduction (5 dBA or more) and suggested maximum noise wall heights (20 feet abovegrade). Due to the uncertainties of future community development timing, noise wall requirements are unknown at this time. The City standards for interior noise levels apply the HUD 45 dBA interior noise level threshold. No additional mitigation measures are suggested.

4.16.10 Residual Impacts

Because no additional mitigation measures are suggested, the residual impacts to noise receptors would be the same as discussed under all action alternatives.

4.16.11 Short-term Uses versus Long-term Productivity

Under all action alternatives, the project area would be converted from existing land uses to transportation. The current productivity of the area in terms of noise is one with minor contributions from intermittent local residential and recreational vehicle use in the project area.

Although there would be a loss in the capability of the project area to maintain relatively low noise level conditions with few traffic noise sources, the new transportation network would provide increased mobility to the traveling public and future area residents.

4.16.12 Irreversible and Irretrievable Commitment of Resources

There would be an irretrievable loss of relatively low noise levels if the SVPP were implemented, because of the presence of commuter and recreational traffic on a paved Parkway. There may be an irreversible

loss of relatively low noise level conditions because the Parkway could enable residential development and expansion of the transportation system in the area.

4.17 HAZARDOUS MATERIALS AND PUBLIC SAFETY

4.17.1 Analysis Area, Approach and Assumptions

The area of analysis for hazardous materials and solid waste includes the 250-foot-wide project ROW for each alternative alignment (the area where these materials would be generated and used), and the additional search distances specified in ASTM Standard E 1527-05 (ASTM 2005). The ASTM determines these search distances to be appropriate distances in which to search for potential sources of contamination which could affect the project area (Table 4-36).

Table 4-36. Hazardous Materials Analysis Areas

Environmental Record Source	Approximate Minimum Analysis Area (mile)
Federal NPL	1.0
Federal Delisted NPL	0.5
Federal CERCLIS	0.5
Federal CERCLIS NFRAP	0.5
Federal RCRA CORRACTS	1.0
Federal RCRA non-CORRACTS TSD	0.5
Federal RCRA Generators	250-foot-wide ROW and adjacent properties
Federal IC/EC	250-foot-wide ROW
Federal ERNS	250-foot-wide ROW
State and Tribal Hazardous Waste Sites (NPL Equivalent)	1.0
State and Tribal Hazardous Waste Sites (CERCLIS Equivalent)	0.5
State and Tribal Landfill and/or Solid Waste Disposal Sites	0.5
State and Tribal LUST	0.5
State and Tribal Registered UST	250-foot-wide ROW and adjacent properties
State and Tribal IC/EC	250-foot-wide ROW
State and Tribal Voluntary Cleanup (VCP) Sites	0.5
State and Tribal Brownfield Sites	0.5

CERCLIS = Comprehensive Environmental Response, Compensation, and Liability Information System
CORRACTS = Corrective Action Sites
ERNS = Emergency Response Notification System
IC/EC = Institutional Controls / Engineering Controls
LUST = leaking underground storage tank
NFRAP = no further remedial action planned
NPL = National Priorities List
RCRA = Resource Conservation and Recovery Act
TSD = Treatment, Storage, and Disposal
UST = underground storage tank

Proposed transportation routes to disposal sites were not included in the area of analysis because the most likely disposal site is the Butterfield Station Landfill, operated by Waste Management, Inc., which is located nearly adjacent to the east of the southern terminus of the project area. Environmental consequences analyzed consider the compatibility of the alternatives with currently existing hazardous

materials, as well as additional hazardous materials and solid waste that may be generated under each alternative. Cumulative impacts are analyzed and discussed in Section 4.17.9.

Because the primary impact from the use of hazardous materials and the generation of solid waste would be from potential leaks and spills and potential contamination of surrounding soils, surface waters, and groundwater, these materials are discussed in terms of 1) the types of materials that would occur on-site for construction and operation of the project, 2) their relative risk, and 3) how these materials and wastes would be managed for the project to prevent these impacts. Certain chemicals and materials that would be used during the construction and operation of the project are characterized as hazardous materials. Improperly handled chemicals and other hazardous materials have the potential to cause health issues in humans. Project construction and operation activities would generate certain hazardous and nonhazardous solid waste streams. Hazardous materials, wastes, and regulated, nonhazardous solid wastes are governed by the laws, regulations, and policies discussed in Section 3.17.1.

This analysis assumes a variety of safety-related plans and programs would be developed and implemented to ensure safe handling, storage, and use of hazardous materials. A spill prevention plan (SPP, sometimes referred to as a Spill Prevention Control and Countermeasure [SPCC] or spill control plan [SCP]) would be developed and implemented prior to construction of the project, and a stormwater pollution prevention plan (SWPPP) would address such aspects as proper storage and spill containment for hazardous materials, fuels, and lubricants used during construction.

The basic principle of a SWPPP is that construction project operators must identify areas and activities that may contribute pollutants to stormwater and must implement BMPs to minimize those pollutants. The primary pollutant from construction sites is sediment discharges from increased erosion. Adequate and effective erosion and sediment control BMPs must be used to minimize sediment discharges. Other potential pollutants from construction sites include fuels, lubricating oils, construction materials, fertilizers, and pesticides. Construction sites can also generate other pollutants associated with on-site wastes, such as sanitary wastes or concrete truck washout. Managing these properly is critical to ensure pollutants do not reach surface waters through stormwater runoff (ADEQ 2008b).

Therefore the operator is required to develop and implement a SWPPP. The SWPPP characterizes the construction activity, identifies potential sources of pollutants, describes how the site will be managed and monitored, and describes the BMPs that will be implemented to help ensure pollutants do not reach surface waters. BMPs may include stormwater controls, erosion and sediment controls, good housekeeping practices, stabilization practices, structural practices, non-stormwater discharge management, and other controls (e.g., off-site tracking of soils and dust management) (ADEQ 2008b).

An SPP is an important tool in preventing spills. An SPP specifies materials handling procedures and storage requirements, and identifies spill cleanup procedures for areas and processes in which spills may potentially occur. The plan standardizes process operating procedures and employee training in an effort to minimize accidental pollutant releases that could contaminate stormwater runoff. Maintaining a well-designed engineering procedure for preventing spill events is the overall goal of the plan. The plan also provides effective countermeasures to prevent significant migration of contaminants and prevent impacts to environmental resources (EPA 1999).

Personnel would be supplied with appropriate personal protective equipment (PPE) and would be properly trained in the use of PPE, the handling, use, and clean-up of hazardous materials potentially associated with construction or operation of the project, as well as procedures to be followed in the event of a leak or spill. Adequate supplies of appropriate clean-up materials would be stored in construction areas.

A number of BMPs are recommended to prevent hazardous materials from coming in contact with the environment. BMPs would be detailed in the SWPPP and SPP. These plans would detail BMPs such as retaining sediments on the construction site by soil erosion and sediment control practices and proper refueling and maintenance procedures for equipment. Implementation of these plans, as well as compliance with federal, state, and local regulations, would provide sufficient mitigation to ensure that there would be no direct or indirect impacts from the use of hazardous materials or the generation of solid waste during construction activities.

It is assumed that there would be no other use of the project area, except for transportation. Impacts from hazardous materials in the area of analysis from implementation of the SVPP are discussed in terms of changes from the existing use.

4.17.2 No Action

Under the No Action Alternative, the land on which the project is proposed would continue to be managed under the existing conditions. Current activities in the area, such as livestock grazing, agriculture, and dispersed recreational use, would not result in the generation, use, or disposal of major quantities of hazardous materials and hazardous and solid waste within the project area. This includes the Butterfield Station Landfill (AZ Solid Waste Facility No: 07032700.01, EPA ID No. AZD983481813), which only accepts non-hazardous waste (SWCA 2009c, 2009d). The status of existing facilities described in Section 3.17.2 would remain unchanged. Much of the project area is vacant land, and land in the immediate vicinity of the project area and alternatives would remain primarily open desert under the No Action Alternative.

Other actions in the surrounding area, such as SR 303L construction, Hassayampa Freeway construction, various pipelines, and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa would likely occur with or without the Proposed Action. These potential projects and developments would result in additional use of hazardous materials and increased quantities of generated solid waste during their construction phases, additional transportation of hazardous materials through the area of analysis during their use, and additional generation of solid waste after the communities are developed.

4.17.3 Impacts Common to all Action Alternatives

The implementation of any of the alternatives would result in the use of hazardous materials and creation of solid waste during construction. Potential hazardous materials associated with construction activity could include solvents, metals, petroleum products (oils, fuels, asphalt degreaser, lubricants, etc.), plated products, hazardous substances, paint, treated-wood products, and other products typically associated with Parkway construction sites. Hazardous materials may also include herbicides and other construction chemicals such as concrete products, sealants, and wash water associated with these products. Solid wastes may include paper, wood, metal, cured concrete, and general trash. Direct and indirect impacts during operation of the SVPP would be no more than from other roadways in use today.

Construction grading and utility installation activities may impact the Hamilton Homes Property at the southwest corner of Rainbow Valley and Riggs Roads, where a leaking underground storage tank was reported in 1999. The leaking tank was permanently removed in May 2006, and the site was closed in January 2007 with soil levels meeting risk-based corrective action Tier 1 standards. The precise location of the former LUST is unknown and may be within or outside of the 250-foot-wide project ROW (SWCA 2009c, 2009d). If the project footprint is found to overlap with the former LUST site, additional

mitigation measures may include soil sampling and proper removal and disposal of any remaining contaminated soils.

Construction grading and utility installation activities may impact the RM Cat Environmental Services Remediation Area cleanup site, which is mapped in the general vicinity of the project area at the southern terminus of the corridor at Maricopa Road (SR 238). However, the exact location of the remediation area is unknown and is likely to be along the railroad tracks south of Maricopa Road (SR 238) because RM Cat Environmental Services (now called Balfor Environmental) specializes in train derailments and spill cleanup. The cleanup site was listed with a status of "not active" on October 31, 2006 (SWCA 2009c, 2009d). If the project footprint is found to overlap with the remediation area, additional mitigation measures may include soil sampling and proper removal and disposal of any remaining contaminated soils. Note that this cleanup site is only common to the major alternatives; Sub-alternatives F and G are not in the vicinity of this site.

The mitigation measures described above in Section 4.17.1 are implemented to prevent spills and leaks of hazardous materials, and to provide for adequate containment and cleanup if they do occur. With adherence to LORS and the applicant-committed environmental protection measures described in Chapter 2, and implementation of the SWPPP and SPP, construction and operation of any of the alternatives would not result in direct or indirect impacts from hazardous materials or solid waste to surrounding soils, surface water, or groundwater.

Although the specific equipment and construction methods for the SVPP have not been determined, it is likely that more hazardous materials would be used and stored, and used and stored for longer periods of time, during construction of a wider Parkway. Thus it follows that construction of a four-lane Parkway would likely use and store more hazardous materials, for a longer period of time, than a two-lane Parkway, and the same applies for a six-lane Parkway over a four-lane Parkway.

4.17.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

The mitigation measures described above in Section 4.17.1 are implemented to prevent spills and leaks of hazardous materials, and to provide for adequate containment and cleanup if they do occur. With adherence to LORS and the applicant-committed environmental protection measures described in Chapter 2, implementation of the SWPPP and SPP, and potentially the additional mitigation described in Section 4.17.3 for the Hamilton Homes and RM Cat Remediation sites, the construction and operation of Alternative A would not result in direct or indirect impacts from hazardous materials to surrounding soils, surface water, or groundwater.

It is likely that more hazardous materials would be used and stored, and used and stored for longer periods of time, during construction of a wider Parkway. Thus it follows that construction of a four-lane Parkway would likely use and store more hazardous materials, for a longer period of time, than a two-lane Parkway, and the same applies for a six-lane Parkway over a four-lane Parkway. However, for the reasons stated in the previous paragraph, direct or indirect impacts from hazardous materials within the project area are not anticipated for any of the phases under this Alternative.

4.17.5 Alternative C Direct and Indirect Impacts

Alternative C's direct and indirect impacts from the use of hazardous materials and the generation of solid waste would be the same as described under Alternative A, except as described below.

Because Alternative C is approximately 15% longer than Alternative A, construction activities would likely consume a comparably higher amount of hazardous materials and would generate a comparably higher amount of solid waste. The quantity of hazardous materials on the project area at a given time would likely be the same as for Alternative A, but would remain on-site for a longer period of time because construction would likely take longer.

Similarly, it is likely that more hazardous materials would be used and stored, and used and stored for longer periods of time, during construction of wider Parkways. Thus it follows that construction of a four-lane Parkway would likely use and store more hazardous materials, for a longer period of time, than a two-lane Parkway, and the same applies for a six-lane Parkway over a four-lane Parkway. However, as previously stated, direct or indirect impacts from hazardous materials within the project area are not anticipated for any of the phases under this alternative.

4.17.6 Alternative H Direct and Indirect Impacts

Alternative H's direct and indirect impacts from the use of hazardous materials and the generation of solid waste would be the same as those described under Alternative A, except as described below.

Because Alternative H is approximately 16% longer than Alternative A, construction activities would likely consume a comparably higher amount of hazardous materials and would generate a comparably higher amount of solid waste. The quantity of hazardous materials on the project area at a given time would likely be the same as for Alternative A, but would remain on-site for a longer period of time because construction would likely take longer.

Similarly, it is likely that more hazardous materials would be used and stored, and used and stored for longer periods of time, during construction of a wider Parkway. Thus it follows that construction of a four-lane Parkway would likely use and store more hazardous materials, for a longer period of time, than a two-lane Parkway, and the same applies for a six-lane Parkway over a four-lane Parkway. However, as previously stated, direct or indirect impacts from hazardous materials within the project area are not anticipated for any of the phases under this alternative.

4.17.7 Sub-alternative F Direct and Indirect Impacts

Sub-alternative F's direct and indirect impacts from the use of hazardous materials and the generation of solid waste would be the same as those described under Alternative A, except as described below.

While this Sub-alternative avoids the RM Cat Remediation site, and is the shortest and most direct route, it passes directly through the Butterfield Station Landfill, an active municipal solid waste landfill (AZ Solid Waste Facility No. 07032700.01, EPA ID No. AZD983481813) operated by Waste Management, Inc. Beyond the obvious logistical concerns of relocating over 5 acres of existing landfill contents to construct a Parkway, major and costly additional mitigation measures would be required, such as extensively sampling the waste for contaminants, proper removal and disposal of the waste elsewhere, and re-engineering of existing landfill liner systems and leachate and methane collection systems. Direct impacts would include exposing potentially hazardous waste materials to the environment, and exposing personnel to the potentially hazardous waste materials. Existing landfill liners in the area would be removed, and could compromise adjacent liner material in the process. Landfills generally have setback requirements from public Parkways, and special variances from various state and federal agencies may be needed. Indirect impacts at the landfill could also include temporary disruption of existing leachate and methane collection systems, which could put the environment and personnel at risk. The environmental

implications and necessary mitigation measures for cutting through the landfill are far more than can be adequately described in this document.

The above concerns apply to all phases of Sub-alternative F.

4.17.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

Sub-alternative G's direct and indirect impacts from the use of hazardous materials and the generation of solid waste would be the same as described under Alternative A, except that this Sub-alternative avoids both the RM Cat Remediation site and the Butterfield Station Landfill. This applies to all phases of Sub-alternative G.

4.17.9 Additional Mitigation Measures

No additional mitigation measures are suggested beyond those already described in Chapters 2 and 3, unless the project footprint is found to overlap with the Hamilton Homes LUST site or the RM Cat Remediation site, in which case additional mitigation measures may include soil sampling and proper removal and disposal of potentially contaminated soils. If Sub-alternative F is proposed, major additional mitigation measures would be required. Proper sampling and handling of potentially contaminated soils would ensure that there would be no direct or indirect impacts from hazardous materials in the remediation area.

4.17.10 Residual Impacts

No residual impacts are anticipated from the use of hazardous materials or creation of solid waste under any of the action alternatives or sub-alternatives.

4.17.11 Short-term Uses versus Long-term Productivity

The mitigation measures described above are implemented to prevent spills and leaks of hazardous materials, and provide for adequate containment and cleanup if they do occur. With adherence to LORS and the applicant-committed environmental protection measures described in Chapter 2, implementation of the SWPPP and SPP, and potentially the additional mitigation described in Section 4.17.3 for the Hamilton Homes and RM Cat Remediation sites, the construction and operation of the SVPP would not result in a change of productivity of the project area due to impacts from hazardous materials to surrounding soils, surface water, or groundwater.

4.17.12 Irreversible and Irretrievable Commitment of Resources

With adherence to LORS and the applicant-committed environmental protection measures described in Chapter 2, implementation of the SWPPP and SPP, and potentially the additional mitigation described in Section 4.17.3 for the Hamilton Homes and RM Cat Remediation sites, there would be no irreversible commitment of resources caused by the use of hazardous materials and the generation of solid waste under any of the action alternatives. The mitigation measures previously described are implemented to

prevent spills and leaks of hazardous materials, and provide for adequate containment and cleanup if they do occur.

4.18 SOCIAL AND ECONOMIC CONDITIONS

4.18.1 Analysis Area, Approach and Assumptions

Social and economic conditions include analyses of population and demographics, economic sectors and employment, environmental justice, and quality of life for the proposed project. The study area for the socioeconomic analysis consists of the communities of Goodyear and Maricopa, as well as Maricopa and Pinal Counties. This analysis focuses on the populations closest to the project area and includes a broad cross section of demographics in which the project is situated. The data presented for state-, county-, and Census Tract-level demographics are used for comparison purposes. The impacts analysis for socioeconomics evaluates the social and economic effects, both positive and negative, of the construction and operation of the SVPP.

Short-term impacts are considered to be 1.5 to 4 years (generally, the construction phase). Long-term impacts are considered to be greater than 4 years for the life of the project (post-construction use of the Parkway).

The social and economic impacts are quantified where possible. However, where quantification of impacts is not possible, the analysis includes a qualitative discussion of possible effects. Current AUMs for the Beloat and Conley allotments are being assessed and are not known at this time. The analysis includes separate but integrated approaches to addressing social, economic, fiscal, and environmental justice impacts of the SVPP.

4.18.2 No Action

Under the No Action Alternative, the SVPP would not be built, and impacts to social and economic conditions would remain similar to current conditions. However, no access would be available to the annexed areas south of Goodyear and connecting to Mobile, and people would continue to use the EPNG pipeline maintenance road which presents certain safety risks to public traffic. Under the No Action Alternative, the primary purpose of the project would not be met and no direct access to/from the city of Goodyear to the SVPA would exist to facilitate traffic movement and meet existing and future transportation demand for a transportation connection within this area. Additionally, emergency services would not have a route that would allow timely response to residents of the SVPA. Currently residents, municipal services, and commuters only have two viable options for traveling to and from the municipal boundaries of Goodyear south to Mobile and beyond: 1) an easterly route that uses SR 238 east to SR 347 (Maricopa Road), SR 347 north to 51st Avenue, 51st Avenue to I-10, and I-10 west to Goodyear—a total distance of over 55.5 miles; or 2) a westerly route that uses SR 238 west to SR 85, SR 85 to I-10, and I-10 east to Goodyear—a total distance of about 68 miles.

Recent population growth has created increasing traffic volumes on area roadways that have markedly reduced the operating conditions on these roadways. Some members of the public, including residents of Mobile, as well as others from outside the community, have been using the unpaved EPNG pipeline maintenance road to travel to and from Mobile and the core areas of the city of Goodyear. Such use poses a safety risk and is not recommended by the BLM because EPNG's authorization to use the ROW does not include public travel safety concerns around buried pipelines. The maintenance road runs northwest-southeast and generally parallels the eastern boundary of the SDNM. Four existing natural gas pipelines

(three EPNG gas lines and one Transwestern gas line) are buried directly beneath the maintenance road, and in some places they lie only a few inches beneath the surface and pose a safety threat to the vehicles driving over them. Unauthorized vehicles using the maintenance road also exacerbate erosion problems. Under the No Action Alternative, continued and additional public use of the EPNG pipeline maintenance road would persist, causing further safety risks.

From a regional perspective, the Sonoran Valley Parkway was conceptualized to provide an important connection within the regional transportation framework established by the MAG in the Regional Transportation Plan (2010) and the Hidden Valley Transportation Framework Study (2009). Under the No Action Alternative this important link in the regional transportation network would not be realized.

Under the No Action Alternative, both short-term and long-term negative, moderate to major impacts would occur both locally and regionally, as travelers and residents within the SVPA would not have a viable roadway connection from southern Goodyear to Mobile, SR 238, and beyond. These travelers may continue to use the EPNG pipeline road which is unsafe for large volumes of traffic. In the long term, as population growth continues, use of the EPNG pipeline road may become increasingly unsafe, because the purpose of the road is for maintenance access and it is not built to accommodate large volumes of vehicular traffic.

4.18.3 Impacts Common to all Action Alternatives

The introduction of a Parkway in the Rainbow Valley area would provide a transportation corridor where currently none legally exists. The impacts common to all action alternatives from the socioeconomic and environmental justice conditions perspective would include the potential for spurred residential and commercial growth as an indirect effect of the introduction of a Parkway; increased transportation and access to enhance public health and safety and emergency services; the increase of noise generated by the Parkway; the potential for reduction in wildlife and wildlife habitats; and the potential for reduction in recreationist and viewer experience in this rural, semiprimitive desert landscape. Impacts to socioeconomic and environmental justice are largely the same for each of the alternatives.

Long-term impacts to social and economic conditions from the introduction of the Parkway would be largely local and beneficial, that is, a new transportation corridor would benefit the current residents within the Rainbow Valley area as well as residents of Goodyear, Mobile, Maricopa, and beyond, by providing a safer alternative than the EPNG pipeline road, and improved transportation connections. Economic impacts would not be directly affected by the introduction of a road. Environmental justice populations would also benefit from the proposed Parkway, since it could provide increased access to public transit options for citizens who do not own a vehicle.

4.18.3.1 Population and Demographics

Under all action alternatives, project construction would occur on a phased schedule over the course of several years for each phase (the exact construction schedule has yet to be determined; each phase would add two additional through-lanes). The staffing for project construction would be expected to draw from the existing construction workforce in the region, including metropolitan Phoenix. According to Arizona Industry Employment projections for 2011 through 2013, construction-related jobs are expected to grow by over 13,000 and construction represents one of the major sectors for projected employment gains, particularly in the sub-sectors of heavy and civil engineering construction (EPS 2012). Because of the availability of construction workers within the metropolitan Phoenix area, construction workers would commute to the SVPP from their local residences rather than relocate. Therefore, there would be no anticipated increase in population or change in demographics in the short-term due to construction.

Studies have shown that one important effect of building a Parkway is the increase in commercial or residential development as the Parkway allows accessibility, reduction in travel time and cost, better access to public schools, and transport of goods and services, resulting in a benefit for both social and economic conditions. During operation of the Parkway, increased access to the SVPA and Mobile areas is expected to spur on commercial and residential growth (ADOT 2001). In addition, and indirectly related to the construction of the Parkway, population growth projections indicate considerable increases in population within Rainbow Valley (MAG 2009). According to the City of Goodyear, the SVPA is estimated to have over 202,000 residents and nearly 60,000 jobs at build-out conditions (City 2007). Therefore, should the exponential increase in population and development in the long term occur, the impacts of the SVPP within the local and regional context would be beneficial to the population. Generally, the SVPP would also provide a benefit to the community, since it would provide a safe alternative for transportation access where one does not currently exist.

4.18.3.2 Economic Sectors and Employment

Economic Activity

Impacts to economic factors which include income, cost of living, and taxes and revenues are discussed below.

Income

The proposed project would provide income to construction workers, therefore impacts to income will be beneficial and short-term. The timeframe for construction of the proposed Parkway is currently unknown and will be dependent upon future transportation funding availability.

Though direct and indirect economic impacts to income are largely unquantifiable, from a qualitative perspective, the operation of a new Parkway where one did not exist previously, will provide access to new areas for residential and commercial development, thus providing more potential opportunities for income generation.

Cost of Living

Given the relatively small number of construction workers needed to build this 15.7-mile-long Parkway, cost of living is not expected to be affected.

Cost of living may be indirectly impacted by the addition of the proposed Parkway, as studies indicate that proximity to a Parkway reduces travel time and cost of travel, by decreasing the vehicular distances being traveled. In addition, access to a Parkway also allows for the capability of affordable housing to be purchased. Changes to the cost of living index due to the construction and operation of the Parkway is unquantifiable at this time.

Taxes and Revenues

Property Tax

Because the construction workers are anticipated to commute rather than relocate to the project area, the proposed project is not expected to have any effect on property tax. However, real property taxes are calculated by Maricopa County based on the assessed value (not current market value) of a property and multiplied by the tax rate set in August of each year. Therefore, should the assessed value of real property in the Rainbow Valley area increase due to additional development or other factors, property tax may, correspondingly, increase providing a long-term benefit.

Sales, Use, and Lodging Taxes

Construction workers are anticipated to commute rather than relocate to the project area, therefore the construction of the Parkway is not expected to have any effect on lodging taxes within the region. However, construction workers are likely to purchase more goods and services locally as a result of being employed, which could slightly increase sales and use tax revenue generated in the study area and region. In the long-term, increased access to the Rainbow Valley area may promote additional visitors and travelers to the area, thus increasing sales and lodging tax revenue.

Housing and Property Values

Housing and property values in the Goodyear area have been highly affected by the economic downturn similar to the general negative shift in the housing market affecting the entire nation. Initially, the Parkway concept originated based on proposed residential development within Rainbow Valley, as currently no transportation access exists. Despite the withdrawal of large planned residential developers in the area, the need for a transportation facility still exists and would provide access to existing and future residences which would likely result in an increase in land value, property values, and building permits for new construction.

Property values generally reflect two components of value: the land itself; and the improvements on the land. Studies have shown that high-capacity Parkways often have a negative impact on property values at a localized level; however in general, land values increase with the overall improvement of a community, which would include the addition of transportation improvements. Additionally, little information exists on the effect of Parkways on property values, as Parkways are typically more conducive to urban development that supports a multitude of activities and the overall desirability of a location (ADOT 2001). A quantitative assessment of changes to housing and property values as a result of the Parkway was not conducted for this analysis.

In general, the housing stock in the Rainbow Valley area is low-density residential, with the largest concentration located near Mobile and SR 238 (at the southern terminus of the proposed Parkway). Though current trends in the housing market indicate that conditions are improving, the likelihood of large-scale developments being funded and constructed in Rainbow Valley is unconfirmed at this time. Though property values and plans for new development within the city of Goodyear have been highly affected by the economic downturn, the housing market is beginning to improve as indicated by the decrease in foreclosures and the slight increase in applications for building permits. Additional improvement to the housing market in general is expected, and the addition of a Parkway for access to Rainbow Valley will likely improve the appeal of this area for prospective investors and residents, thus providing a long-term benefit for housing and property values.

Economics Related to Recreation

Revenue generated from recreational activities composes a large proportion of state and regional economics (Dean Runyan 2006). As stated in Section 4.13 Recreation Management, all action alternatives would result in a direct loss of recreational settings and opportunities within the transportation ROW. However, recreational activities would still be accessible for the surrounding landscape and the introduction of a Parkway may promote additional recreational opportunities to the area due to improved access.

Each dollar spent by an angler or hunter increases another person's income, enabling that person (or business) to spend more, which in turn increases income for someone else. The process continues to circulate throughout the economy until it is dissipated through 'leakages' in the form of savings or payments for goods and services from outside the local economy. In the end, the cumulative changes in

spending, incomes, and employment are a multiple of the initial retail sales spending (AGFD 2002). Changes to recreation-driven economic revenue would not occur as a result of the construction and operation of the Parkway, as no fee-generating activities (e.g., hunting, enthusiast events, etc.) occur in the Rainbow Valley area. Impacts resulting from the proposed Parkway would be considered the loss of opportunity to recreate in the immediate ROW, which is monetarily unquantifiable. However, increased access to an area for the purposes of recreation could generate recreation-related revenue, though the exact extent of recreation-generated revenue is unknown.

Increased growth in Arizona exerts environmental pressures on surrounding areas as development moves closer to BLM lands. As growth continues and development increases, the demand for access to and use of open space and recreational areas will also increase.

Economics Related to Livestock Grazing

Revenue generated from livestock grazing is based on resource and livestock conditions. Loss of forage and available AUMs within the proposed SVPP ROW could result in a loss of grazing-related revenue to the federal government; however, ranchers may find alternative forage to offset some of these anticipated losses. Currently, the Beloat and Conley allotments are identified for active livestock grazing. The SDNM RMP (2012) removed 77,485 acres located within the SDNM from the Conley allotment. Each alternative presented for the SVPP would change or reconfigure the livestock grazing allotment boundaries. Reconfiguring livestock grazing allotment boundaries would impact the livestock movement patterns, the allotment permittee, and the BLM. Reconfiguring livestock grazing boundaries may prevent livestock from moving in and out of the existing pasture in site-specific locations (as analyzed in Section 4.12, Livestock Grazing), require new grazing improvement construction, render grazing improvements unusable, and may decrease available acreage for grazing, which could decrease the AUMs and subsequent value of the allotment. This would result in an adverse, long-term impact to the economics generated from livestock grazing on the Conley allotment, both for the allotment permittee as well as the federal government. However, at this time, AUMs and reconfiguration of boundaries by alternative are unknown.

Employment

The construction workforce for the SVPP would be expected to be filled by the available labor supply in Maricopa County and metropolitan Phoenix. Construction employment resulting from the development of the SVPP would be a beneficial, short-term impact to individuals in nearby communities seeking employment, because the project would provide new construction jobs to an area that has recently endured high rates of unemployment. Because total employment from construction would come from the available labor supply in Maricopa County and metropolitan Phoenix, it would have a negligible effect on total employment in the study area. In the long term, development of commercial and industrial centers are planned for Rainbow Valley, and so the Parkway would indirectly benefit employment conditions because it would provide improved access from residences to employment centers.

Unemployment

Although construction of the SVPP may offer short-term employment opportunities to residents of the study area, overall impact on unemployment in the study area would be negligible. During operation of the SVPP, total impacts on unemployment may indirectly be improved because the Parkway would provide access to employment opportunities for residents.

4.18.3.3 Environmental Justice

As discussed in Chapter 3.18, consideration of environmental justice issues is mandated by Executive Order 12898, and is required to be examined by federal agencies by "identifying and addressing…disproportionately high and adverse human health of environmental effects of their programs, policies and activities on minority and low-income populations in the United States." For the purposes of this analysis, EJ populations were identified in areas where minority populations composed over 50% of the general population, or were a significantly greater minority population than the reference population, or where low-income populations (those living below the poverty line) exist in larger proportions than the reference population.

Four potential EJ populations were identified in Census Tracts 7233.06, 9410, 9411, and 9413. These Census Tracts had a proportionately higher population of Hispanic, African-American, or American Indian ethnicities (see Table 3-32). Figure 3-25 identifies these Census Tracts to be located within the area of analysis (Census Tract 7233.06) and tribal lands (Gila River Indian Community, Census Tracts 9410, 9411, and 9413), respectively. Additionally, low-income populations also were identified for two of the four minority population Census Tracts (Census Tracts 9410 and 9413), both of which are located within the Gila River Indian Community (over 12 miles to the east). One additional Census Tract revealed a population of over 20% below the poverty level (Census Tract 7233.04). Though both minority and low-income populations were identified within the area of analysis, it was determined that the SVPP would not disproportionately impact these communities relative to all other non-minority populations in the analysis area, regardless of income. In addition, the identified EJ communities are a minimum of 2 miles from the proposed Parkway, further reducing the chances of disproportionate impacts. It was also determined that the introduction of a Parkway on other environmental resources that could negatively affect environmental justice communities (such as air quality, noise, health and human safety, and visual resources) would also not result in a disproportionate or adverse impact on the EJ communities, since these impacts would largely be minor. The addition of a Parkway or transportation access that can also support public transportation would be a beneficial impact to environmental justice communities as currently no, or limited access exists in this area, and public transit provides a mobility option for those who do not own a vehicle.

Quality of Life

The communities of Goodyear and Maricopa, specifically residents closest to the proposed Parkway, would likely notice impacts to their current rural quality of life in terms of transportation and access, noise, recreation experiences, and visual resources. During construction, traffic would increase in the communities near the vicinity of the SVPP. At the peak of construction, construction-related vehicles and equipment would be traveling to and from the construction site on a daily basis, and additional trucks per day would be making trips to and from the site. During operation, traffic volume along SR 238 would continue to increase as a result of greater access to the roadway from the Parkway for commuters from the Rainbow Valley to and from metropolitan Phoenix. Such increases in traffic volume could adversely affect the quality of life for those who value living in a rural community. Conversely, for those who reside within the Rainbow Valley area and commute to and from greater Phoenix, the quality of life may be improved by improved access that the Parkway would provide along with shorter commute times and less traffic. Also, greater access to SR 238 as provided by the Parkway would provide long-term benefits including a better quality of life to residents, by improving emergency response times as vehicles and utility-related traffic would now have direct access to this area.

Construction and operation of a Parkway in the relatively remote Rainbow Valley area is expected to increase the local noise level above the current conditions, both in intensity of the noise and frequency of events. Noise generated by the Parkway is not anticipated to exceed acceptable noise levels for roads.

Other noise generators, such as Luke Air Force Base, Barry M. Goldwater Range, the Phoenix-Goodyear Municipal Airport, and the Lufthansa Aviation Training facility, are located well outside of the immediate Parkway and are not anticipated to contribute to major noise increases. Noise generated by OHV use is often the biggest contributing factor currently to increased ambient noise in the area. Changes in the soundscape can adversely affect the quality of life for nearby residents and recreationists who experience cumulative increases in noise-generating activities. However, construction and operation of a Parkway is subject to local noise ordinances.

Additionally, during final design and construction, noise-calming techniques such as the use of quiet pavement, noise walls, and other noise abatement measures can be employed both during design and construction and subsequently as necessary. A full discussion of impacts on noise is discussed in Section 4.16.

Recreation experiences can contribute to a person's overall quality of life and/or shape their identity or self-perceptions. Individuals seeking solitude and a primitive recreation experiences could be adversely impacted by the addition of a Parkway during construction and operation. Conversely, during operations, new and improved roads and utility corridors surrounding the SVPP may provide for more opportunities for access, and quicker, safer connections in the Rainbow Valley area for motorized and non-motorized recreationists. The proposed project may therefore be perceived as a beneficial recreational impact for certain user groups. A full discussion of impacts on recreation is discussed in Section 4.13.

From a visual perspective, the proposed project would change the landscape characteristics, existing landforms, and vegetation in the area, which would contribute to an overall change in the sense of place for members in nearby communities. The shift from a rural, desert landscape to a more developed landscape during construction and operation of the SVPP may adversely impact local residents and visitors to the area who are seeking a rural or semiprimitive view or recreation experience. The viewshed within the immediate foreground and middle ground (up to 5 miles away) would have views of a Parkway where none existed previously. The motion of cars and the Parkway itself would present visual contrast which would result in moderate negative impacts within the long term to local populations who seek views of natural and unadulterated landscape. A full discussion of impacts on visual resources is discussed in Section 4.7.

In sum, changes to quality of life would be impacted by the construction and operation of the SVPP, and in some cases, the development of this transportation corridor would improve the quality of life for some local populations, depending on destination and objective. Contrarily, for those seeking a rural and semiprimitive experience, the addition of urbanized features such as a Parkway, accompanied by increased traffic volume (i.e., the two-lane Parkway scenario would allow capacity of approximately 24,000 vehicles per day; four lanes would accommodate 48,000 vehicles per day; and six lanes would accommodate 72,000 vehicles per day) would deteriorate elements that define their quality of life.

4.18.3.4 Two-lane Parkway

The two-lane Parkway would increase access for the area between southern Goodyear and Mobile, Arizona. Currently, no viable access is available for vehicular traffic. Additional transportation access would provide community benefits and spur economic growth. The two-lane scenario would accommodate approximately 24,000 vehicles per day and would allow opportunities for public transit (e.g., buses and paratransit or dial-a-ride) to reach populations located within the Rainbow Valley area. Current transportation conditions in the Rainbow Valley area do not support expected population growth and at the present, many local travelers use the EPNG pipeline road which is unpaved, and unsafe for public traffic.

4.18.3.5 Four-lane Parkway

Impacts from a four-lane Parkway scenario would be the same as the two-lane scenario but would accommodate additional traffic volume. The four-lane Parkway scenario would be constructed dependent upon traffic demand and funding. A four-lane Parkway can accommodate 48,000 vehicles per day. Additional lanes would be added to the two-lane scenario as need is established, or level of service on the Parkway is diminished, and travel time and traffic congestion increases.

4.18.3.6 Six-lane Parkway

The six-lane Parkway scenario would be the ultimate build-out of the road (i.e., no additional through lanes would be accommodated within the ROW). Based upon the City of Goodyear General Plan for land uses in Rainbow Valley at build-out, this area would support 86,000 residential dwelling units, and opportunities for approximately 48,000 commercial or industrial jobs within the 4,200 acres of commercially zoned land. Given these build-out conditions, future growth would generate approximately 1.23 million daily vehicle trips, less than half with an origination or destination within Rainbow Valley, indicating that most of the traffic on the Parkway would be from outside of Rainbow Valley. The six-lane Parkway would accommodate approximately 72,000 vehicles per day and, in tandem with improvements to the overall transportation system in Goodyear and Maricopa County, would support future vehicular traffic demand.

4.18.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

Direct and indirect impacts to Alternative A are presented in the above section, since socioeconomic and environmental conditions for each action alternative are the same.

4.18.4.1 Two-lane Parkway

The introduction of the two-lane Parkway into an area that currently has no improved transportation access would likely result in increased flow of people and goods from southern Goodyear to Mobile, SR 238, and beyond. This connection could spur population growth through the development of residential and commercial centers. However, quantification of potential residential and commercial development is also dependent upon private funding, market trends, and other factors. Population growth could occur regardless of the Parkway being constructed; as stated in the RFD (see Appendix B, Reasonably Foreseeable Development), population in the Rainbow Valley area is expected to grow exponentially over the next few decades, and thus the addition of a transportation facility that accommodates vehicular traffic as well as transit and pedestrian and bicycle traffic would allow for the efficient circulation within the area. The two-lane scenario allows for approximately 24,000 vehicles per day in bidirectional traffic and represents an important connection for southern Goodyear, Mobile, Maricopa, and the region.

4.18.4.2 Four-lane Parkway

The introduction of the four-lane Parkway would be similar to the two-lane scenario but would also result in increased transportation capacity from 24,000 vehicles per day to 48,000 vehicles per day. The four-lane Parkway scenario would support additional population growth as projected by MAG that is slated to occur in this area (MAG 2010).

4.18.4.3 Six-lane Parkway

The introduction of the six-lane Parkway would be similar to the four-lane scenario and would also result in additional increased transportation capacity to 72,000 vehicles per day. The six-lane Parkway scenario would represent build-out conditions of the Parkway (that is, no additional through-lanes would be constructed within the ROW). In addition to accommodating more traffic, the six-lane Parkway could include consideration of improved public transit and pedestrian and bicycle facilities, providing an additional long-term benefit to the local and regional population.

4.18.5 Alternative C Direct and Indirect Impacts

Direct and indirect impacts to Alternative C are presented in the above section, since socioeconomic and environmental conditions for each action alternative are the same.

4.18.5.1 Two-lane Parkway

Impacts from the two-lane Parkway under Alternative C would be the same as under Alternative A. The introduction of the two-lane Parkway into an area that currently has no improved transportation access would likely result in increased flow of people and goods from southern Goodyear to Mobile and SR 238. This connection could spur population growth through the development of residential and commercial centers. However, quantification of potential residential and commercial development is also dependent upon private funding, market trends, and other factors.

4.18.5.2 Four-lane Parkway

Impacts from the four-lane Parkway under Alternative C would be the same as under Alternative A. The introduction of the four-lane Parkway would be similar to the two-lane scenario but would also result in increased transportation capacity. This connection could spur population growth through the development of residential and commercial centers.

4.18.5.3 Six-lane Parkway

Impacts from the six-lane Parkway under Alternative C would be the same as under Alternative A. The introduction of the six-lane Parkway would be similar to the four-lane scenario and would also result in additional increased transportation capacity. This connection could spur population growth through the development of residential and commercial centers.

4.18.6 Alternative H Direct and Indirect Impacts

Direct and indirect impacts to Alternative H are presented in the above section, since socioeconomic and environmental conditions for each action alternative are the same.

4.18.6.1 Two-lane Parkway

Impacts from the two-lane Parkway under Alternative H would be the same as under Alternative A. The introduction of the two-lane Parkway into an area that currently has no improved transportation access would likely result in increased flow of people and goods from southern Goodyear to Mobile and SR 238. This connection could spur population growth through the development of residential and commercial centers. However, quantification of potential residential and commercial development is also dependent upon private funding, market trends, and other factors.

4.18.6.2 Four-lane Parkway

Impacts from the four-lane Parkway under Alternative H would be the same as under Alternative A. The introduction of the four-lane Parkway would be similar to the two-lane scenario but would also result in increased transportation capacity. This connection could spur population growth through the development of residential and commercial centers.

4.18.6.3 Six-lane Parkway

Impacts from the six-lane Parkway under Alternative H would be the same as under Alternative A. The introduction of the six-lane Parkway would be similar to the four-lane scenario and would also result in additional increased transportation capacity. This connection could spur population growth through the development of residential and commercial centers.

4.18.7 Sub-alternative F Direct and Indirect Impacts

Sub-alternative F, a 2.8-mile-long segment of the Parkway which would provide the southern connection to SR 238, would have the same impacts as those presented in the Impacts Common to All Action Alternatives section, since socioeconomic and environmental conditions for each action alternative are the same.

4.18.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

Sub-alternative G, a 2.4-mile-long segment of the Parkway which would provide the southern connection to SR 238 and the BLM Preferred Sub-alternative, would have the same impacts as those presented in the Impacts Common to All Action Alternatives section, since socioeconomic and environmental conditions for each action alternative are the same.

4.18.9 Additional Mitigation Measures

The following mitigation measures, or actions undertaken to avoid or reduce adverse impacts, are recommended for socioeconomic and environmental justice conditions:

- Reimbursement to allotment permittees for lost AUMs and range improvements.

4.18.10 Residual Impacts

Residual impacts are those impacts that remain after applying mitigation measures. No residual impacts resulting from the proposed project with regard to socioeconomic and environmental justice conditions are expected.

4.18.11 Short-term Uses versus Long-term Productivity

Under all action alternatives, social and economic conditions would be altered in both the short and long term, with new and existing transportation constructed and expanded from existing transportation routes. The current transportation routes within the area do not present enough viable options for commuters to and from the Phoenix metropolitan area. Given existing levels of traffic congestion and use of

unauthorized utility roads for commuting, new transportation uses would provide better means of transportation for residents, emergency services, and infrastructure maintenance. This could increase long-term productivity in terms of improving quality of life conditions for commuters in the area.

4.18.12 Irreversible and Irretrievable Commitment of Resources

The introduction of a Parkway would create no irreversible or irretrievable commitment of resources for socioeconomic and environmental justice conditions.

4.19 CUMULATIVE IMPACTS

Based on the list of cumulative actions (Appendix H, SVPP Cumulative Actions), the following discussions identify which of those actions would have a cumulative effect per resource area.

4.19.1 Air Resources

The area of analysis for air resources cumulative impacts is the extent of the SVPA. The SVPA represents a reasonable region in which existing land use types, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented. In this analysis, the SVPA is defined as the area bounded by Patterson Road on the north, the Papago Road Alignment (which lies 4 miles south of SR 238) to the south, the Maricopa–Pinal County boundary on the east, and the SDNM on the west.

The past and present actions in the SVPA have had a direct effect on the air quality in the area. Land in the SVPA is largely undeveloped and is characterized by vacant desert, agricultural lands, and by areas used for grazing, mining, utilities, recreation, and widely dispersed, low-density residential development. Past recreation use consists of mostly hiking, hunting, horseback riding, and driving for pleasure. The combination of sparse development, unpaved roadways, and recreation has contributed to the high measured concentrations of coarse particulates (PM_{10}) and the current non-attainment status for this criteria pollutant. Present actions have not significantly changed the rural character of the area.

Reasonably foreseeable actions in the SVPA include the Hassayampa Freeway construction and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. These potential developments would result in increased urbanization of the area and increased proximity of receptors to an expanded local roadway network. Concentrations of CO could potentially increase due to increases in traffic but PM_{10} concentrations could be reduced by providing paved surfaces for local traffic that is currently utilizing the segmented unpaved roadway network.

Under all action alternatives and sub-alternatives, construction and operation of the SVPP would result in additional emissions of criteria pollutants. All air emissions would be appropriately mitigated to comply with the CAA, MACQD Air Pollution Control Regulations, the Arizona SIP, and new SIP revision, titled *MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area* (MAG 2012).

4.19.2 Cultural and Heritage Resources

The analysis area for cumulative effects consists of a 1-mile buffer around the ROW for the alternatives and sub-alternatives. Projects that may contribute to cumulative impacts from the construction of the SVPP include increased access to heretofore remote BLM lands, residential development along the SVPP

corridor, and construction of more highways and other roads such as the proposed SR 303L. Increased access and visitation to the resources via the SVPP increases the threat of disturbance from off-road recreational activities and looting. Because the Parkway and future development would change the character and usage of the southern end of Rainbow Valley from backcountry and rural to more suburban and urban, increased development along the SVPP corridor would lead to direct impacts to the resources, such as additional removal of cultural resources from the landscape; and the indirect effect of altering the setting through visual and auditory impacts. The construction of other roads such as the proposed I-11 (Hassayampa Freeway) may cross the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor and Management Area, which would lead to further fragmentation of the resources.

Cumulative impacts may also include impacts to as-yet undiscovered historic properties as a result of future actions, such as future residential development in the study area, the Rainbow Valley MCFLD plan, the conceptual SR 303L alignment, and the conceptual Hassayampa Freeway alignment. For all of these cumulative actions, the amount and type of disturbance to sites would be the primary impact indicator; however, existing regulations stipulate that all past, present, and future projects, including mining applications, construction of utility lines, fire management, etc., on federal lands are subject first to cultural resources inventory. If sites are found during inventories, disturbance to those sites must be mitigated. Since avoidance is the primary mitigation measure for any project, it can be assumed that the total number of cultural resources that would need to be mitigated further through data recovery or other means for these projects is minimal and would not significantly change the historic or prehistoric character of the analysis area; therefore, cumulative impacts to cultural resources are anticipated under all action alternatives.

4.19.3 Paleontological Resources

The analysis area for cumulative impacts consists of the Rainbow Valley floor surrounding the ROW for the alternatives and sub-alternatives. The sediments on the valley floor are fairly uniform and consist of the same geological units as the overall project area. Actions that may disturb or have disturbed sediments on the valley floor include OHV use, the Sonoran Solar Energy Project, future residential development, the SR 303L alignment, and the Hassayampa Freeway (I-11); however, because the analysis area has a low potential for the presence of paleontological resources (PYFC 2) and no fossils are likely to be present in the analysis area, no cumulative impacts to paleontological resources are anticipated.

4.19.4 Soil Resources

The area of analysis for cumulative impacts to topography, geology, and soils is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing resources, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented. In this analysis, the Rainbow Valley is defined as the Waterman Wash and Rainbow Wash watersheds, bounded generally by the Buckeye Hills and Gila River to the north, the Sierra Estrella Mountains to the east, and the Maricopa Mountains to the south and west.

Land in the Rainbow Valley is largely undeveloped and is characterized by vacant desert, agricultural lands, and by areas used for grazing, mining, utilities, recreation, and widely dispersed, low-density residential development. Construction and operation of the SVPP would not increase the amount of groundwater withdrawal and therefore would not have a cumulative effect on the extent or rate of local land subsidence.

Reasonably foreseeable actions in the Rainbow Valley include expansion of the proposed SVPP from a two-lane Parkway up to six lanes, SR 303L construction, Hassayampa Freeway construction, and future

development in the study area (southern Goodyear, Mobile area, town of Maricopa, etc.). While the expansion of the SVPP to six lanes would occur within the 250-foot-wide ROW and would not result in additional impacts to soil resources beyond those described above, the other potential development would result in further impacts to soil resources in the region by additional grading, paving, building, landscaping, and other actions and associated uses.

Increased development in the area could possibly also result in land subsidence depending on the location of the water supply and the rate of groundwater withdrawal for new development. The source of water supplies for future development is unknown at present.

4.19.5 Vegetation Resources

The area of analysis for cumulative impacts to vegetation resources is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing land uses, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The implementation of the SVPP as proposed along with the past and present actions for this area could create a moderate, long-term cumulative impact to vegetation resources. Past and present actions, such as agricultural activities, Butterfield Station Landfill, transportation corridors, and utility ROWs (see Appendix H, SVPP Cumulative Actions, for a complete list of cumulative actions for this project), have contributed to this impact by removal of vegetation and also potentially introducing non-native plant species.

The implementation of the SVPP as proposed along with reasonably foreseeable actions for this area could create a minor, long-term cumulative impact to vegetation resources. These impacts could include an increased loss of acreage to vegetation communities; an increased loss and/or disturbance of special-status species individuals and their habitat; and increased risk of introduction and establishment by noxious and invasive plant species. Future actions, such as the SR 303L construction, Hassayampa Freeway construction, residential developments (including master-planned communities), and renewable developments, could further contribute to this impact by the removal of vegetation and also potentially introducing non-native plants. However, one reasonably foreseeable action, the BLM Programmatic Weed Environmental Assessment—Waterman Wash, has the potential to create a moderate, long-term beneficial impact to vegetation resources by reducing the impact of noxious and invasive species because its intent is to reduce the risk of wildfires through a reduction of fuels, restoring lands damaged by wildfire, and improving ecosystem health.

4.19.6 Visual Resources

The area of analysis for cumulative impacts to visual resources is the extent of Rainbow Valley. Rainbow Valley appropriately constitutes the area within which existing visual resource conditions and visual resource management objectives, when assessed in combination with other cumulative actions, would be moderately impacted if the SVPP were implemented.

Based on the list of cumulative actions (Appendix H), the following discussions identify which of those actions would have an additive and incremental cumulative effect to visual resources.

Reasonably foreseeable actions such as future residential development, SR 303L, and I-11 would also cumulatively contribute to visual resources impacts in the area from each of the KOPs respectively. At this time, the alignments, dimensions, and construction methods of these transportation and future development projects are conceptual and in various stages of planning. Generally, the most evident

cumulative impacts would be from KOP 2 (residence) and KOP 3 (Sierra Estrella Wilderness). From KOP 2 the addition of the proposed Parkway in combination with future residential, commercial, and transportation development would result in dramatic changes to the viewshed which currently is largely flat, open landscape. Line, texture, and color contrast from future roads would result in views of ribbons or bands of roadways that do not blend with the natural landscape. From KOP 3 (Sierra Estrella Wilderness) visual contrast would be located in middle ground and background distance zones, however, views from this point capture the entire panoramic expanse from an elevated position and therefore would afford views of multiple future developments culminating in moderate to strong visual contrast, tempered only by distance. From KOP 3 similar bands of roadway and additional human-made structure contrast would be evident in the viewshed.

4.19.7 Water Resources

The area of analysis for cumulative impacts to water resources is the extent of Rainbow Valley.

The past and present actions in the vicinity of the project that have had a direct effect on water resources are agriculture, and the expansion of the city of Goodyear and annexation of BLM lands. Impacts from these past actions on surface water include the area of ephemeral drainages that have been disturbed or altered with the footprint of an agricultural field or residential/commercial development. Plans that have been put into place that likely will have a positive impact on surface water resources in the area include the Rainbow Valley FCDMC plan of the Metro Phoenix ADMP. The impact to groundwater resources includes the amount of water that has been pumped for agricultural water or residential use or for the Sonoran Solar Energy Project.

Reasonably foreseeable actions in the Rainbow Valley with the potential to affect surface water resources include future residential development within the Waterman Wash watershed; SR 303L construction; and I-11 (Hassayampa Freeway) construction. All linear transportation projects have the potential to impact surface water drainage and quantity if not designed to allow the passing of ephemeral flows to downstream washes.

Reasonably foreseeable actions with the potential to affect groundwater resources include the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. The cumulative effect of expansion of surrounding communities has the potential to reduce groundwater availability with the additional water demands for new residential and commercial use that would be anticipated with the approximate projected population of 60,000 residents (City 2009). For comparison purposes, Phoenix's annual household water usage is approximately 73,000 gallons per year (City of Phoenix 2013). As stated in the RFD (Appendix B), current development has slowed due to the economic recession of 2008–2011.

4.19.8 Wildland Fire Management

The area of analysis for cumulative impacts to wildland fire management is the Rainbow Valley. Foreseeable future actions that would have a combined cumulative impact on wildland fire management within the analysis area are anticipated population growth and the expansion of Goodyear, Buckeye, and Maricopa city/town limits to accommodate future master-planned communities. Population growth would increase human presence within the ROW as traffic increases, and subsequently increase the chance of fire ignition. Urban expansion along the SVPP and other areas adjacent to BLM lands would result in an increase in WUI areas and a subsequent increased focus on achieving WUI wildland management objectives in these areas.

Conversely, future community development (including but not limited to increased population, increased traffic, and increased roadway network) would include the impacts associated with increased ignition risk, hazards to firefighters and other emergency responders, and increased herbaceous fuel load. Therefore, the cumulative effects to wildland fire management would be moderate but long-term.

4.19.9 Wildlife and Special-Status Species

The area of analysis for cumulative impacts to wildlife resources is the extent of Rainbow Valley, which includes the slopes of the surrounding mountains bounding the Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing land uses, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The implementation of the SVPP as proposed along with the past and present actions for this area could create a moderate, long-term cumulative impact to wildlife. These impacts could include an increased loss and/or disturbance of general wildlife and special-status species individuals and their habitat; and an increased risk of displacement and mortality to general wildlife and special-status species due to noise from construction and travel on the Parkway once constructed. Increased loss and/or disturbance of species and their habitat impacts species by limiting the areas in which they can live, forage, or reproduce, thereby turning basic functions into struggling-just-to-survive functions. Similarly, displacement and mortality of species due to noise and Parkway travel can cumulatively result in the area no longer being compatible for certain species. Past and present actions, such as agricultural activities, Butterfield Station Landfill, transportation corridors, and utility ROWs (see Appendix H, SVPP Cumulative Actions, for a complete list of cumulative actions for this project), have contributed to this impact by removal of habitat and increased human presence in the region.

The implementation of the SVPP as proposed along with reasonably foreseeable actions for this area could create a moderate, long-term cumulative impact to wildlife. These impacts could include an increased loss and/or disturbance of general wildlife and special-status species individuals and their habitat; and an increased risk of displacement and mortality to general wildlife and special-status species due to noise from construction and travel on the Parkway once constructed. Future actions, such as the SR 303L construction, Hassayampa Freeway construction, residential developments, including master-planned communities, and renewable developments, could further contribute to this impact by removal of habitat and increased human presence in the region. However, one reasonably foreseeable action, the BLM Sonoran Desert Protection Proposal, has the potential to create a moderate, long-term beneficial impact to wildlife by providing protection and stewardship for species and their habitats (e.g., identification and protection of wildlife movement corridors) on lands administered by the BLM. Category I Sonoran desert tortoise habitat would need to provide a 5:1 compensation for habitat loss (BLM 1991).

4.19.10 Lands and Realty

The area of analysis for cumulative impacts to lands and realty is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing land uses, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The past and present land uses in Rainbow Valley have had a direct effect on the conversion of lands from one use to another and on the ability to access the area. Land in the Rainbow Valley is largely undeveloped and is characterized by vacant desert, agricultural lands, and by areas used for grazing, mining, utilities, recreation, and widely dispersed, low-density residential development. Past recreation use consists of mostly hiking, hunting, horseback riding, and driving for pleasure. Open desert and

agricultural lands have been converted by past actions to residential, commercial, industrial, and conservation uses. These past actions include historic-era mining and agriculture, expansion of the city of Goodyear into the northern reaches of Rainbow Valley, the Butterfield Station Landfill, utility transmission lines and pipelines, and the designation of the SDNM.

Reasonably foreseeable actions in the Rainbow Valley include SR 303L construction and Hassayampa Freeway construction; Sonoran Desert Wildlife Protection Proposal implementation, and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. These regional roadways would enable future residential development and would result in further changes to the types of land uses.

The SVPP would convert approximately 475 to 554 acres of existing land use from predominantly undeveloped desert land into a transportation land use. This would further reduce the amount of open space land uses (grazing, recreation, undeveloped land), but would increase the ability and likelihood for nearby communities to expand their current city limits and further convert existing land uses.

4.19.11Livestock Grazing

The area of analysis for cumulative impacts to grazing management is the extent of the Beloat and Conley grazing allotments. The Beloat and Conley grazing allotments represent a reasonable region in which existing grazing management, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The past and present land uses in the Beloat and Conley grazing allotments have had a direct effect on the conversion of lands from livestock grazing to another use and on the ability to access the area.

The past and present land uses in the area analyzed for cumulative impacts have had a direct effect on extent of grazing and the amount of forage in the area. Land in the Beloat and Conley allotments is largely undeveloped and is characterized by vacant desert, agricultural lands, and by areas used for grazing, mining, utilities, recreation, and widely dispersed, low-density residential development. Open desert and lands used for grazing have been converted by past actions to residential, commercial, industrial, and conservation uses. Commercial and residential development has encroached on lands used for grazing and reduced the amount of land and forage available for cattle in the Beloat and Conley allotments. These past actions include historic-era mining and agriculture, the Butterfield Station Landfill, utility transmission lines and pipelines, and the designation of the SDNM.

Reasonably foreseeable actions in the Beloat and Conley grazing allotments include SR 303L construction, Hassayampa Freeway construction, Sonoran Desert Wildlife Protection Proposal implementation, the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa, and associated population growth. These developments of public, State, and private land would result in further changes to the vegetation communities that are used as forage for cattle grazing in the livestock grazing cumulative impact analysis area. The growth of master-planned communities would convert more lands to structures and urban landscaping. The six-lane Parkway scenario would be the ultimate build-out of the road (i.e., no additional through lanes would be accommodated within the ROW). Based upon the City of Goodyear General Plan for land uses in Rainbow Valley at build-out, this area would support 86,000 residential dwelling units, and opportunities for approximately 48,000 commercial or industrial jobs within the 4,200 acres of commercially zoned land. And, construction and expansions of freeways and roads would result in the removal and transformation of native vegetation communities to roadways, with a mixture of native and urban vegetation restoration in road ROWs. For both allotments, reasonably foreseeable actions including the SR 303L, I-11, and solar development will likely increase urban development throughout the area, potentially causing these two livestock operations to be untenable, particularly for the Conley allotment.

The SVPP would convert approximately 53.2 to 62.1 acres of existing land use from predominantly vacant desert land into a transportation land use. This would further reduce the amount of open space land used for livestock grazing.

Specific cumulative impacts to the Beloat allotment are discussed below. Article 7-4 of the City of Goodyear Code includes increased fencing requirements, which when considered incrementally with the fencing requirements of the SVPP, would result in long-term, adverse cumulative impacts. Article 7-4 has impacted livestock movement and increased forage fragmentation, and has caused economic impacts to the permittee. Cumulatively, all alternatives impact the Beloat permittee economically by decreasing the number of AUMs able to graze and increasing the need for more hands-on management for movement of livestock between the pastures created by the project. Alternative A would have the fewest impacts because there is a clean division of pastures northeast and southwest of the project. Alternatives C and H would likely create more small pastures that would need new water sources developed in order to be usable.

Specific cumulative impacts to the Conley allotment are discussed below. The SDNM RMP closed the SDNM portion of the Conley allotment to livestock grazing starting in fall of 2014. The Lower Sonoran Field Office portion of the Conley allotment currently remains available for livestock grazing. Each of the alternatives further eliminates grazing outside the SDNM boundaries, by 712 to 320 acres, depending on the sub-alternative selected.

4.19.12Recreation Management

The cumulative effects area of analysis for recreation cumulative impacts is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing recreational resource conditions, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The past and present land uses in Rainbow Valley have had a direct effect on the availability to access, and thereby experience, a variety of recreation settings and opportunities. Undeveloped BLM lands may provide opportunities for dispersed recreation and opportunities for solitude. Lands within Rainbow Valley provide opportunities for dispersed recreation, including camping, hunting, wildlife observation, photography, backpacking, horseback riding, hiking, and backcountry driving. Low-density residential and agricultural developments have converted native shrub communities of the Rainbow Valley to urban landscaping and agricultural crops and pastures. Commercial and residential developments have lead to surface disturbances and clearing of vegetation and planting of both native and non-native vegetation. Population growth has increased traffic and pressure in recreational areas. While large parts of Rainbow Valley remain undeveloped, the mixture of land use development has altered the land, its character, and the viewshed. The Arizona Desert Wilderness Act created opportunities for primitive recreation in surrounding mountains that are designated Wildernesses. Additionally, the designation of SDNM created opportunities for both developed and primitive recreation experiences.

Except for the construction of trails, these developments of public, State, and private land would result in a loss of opportunities for dispersed recreation and would impact dispersed recreation and opportunities for solitude by affecting the recreation setting (creating more human developments) and the desired experience.

The population of Goodyear and the surrounding region is expected to grow and correspondingly the demand for areas in which to recreate, though development pressure has recently decreased. Conversion of public lands from open, undeveloped desert to other uses such as housing, energy development, and roadways would limit opportunities for dispersed recreation and opportunities to experience solitude.

Increased recreational use in areas such as the SDNM, the Maricopa Wilderness Complex, Estrella Mountains Regional Park, the Sierra Estrella Wilderness, and the Buckeye Hills Regional Park may create conflicts between users that may be seeking different recreational settings and experiences.

The recent closures of SDNM routes have decreased the amount of OHV use and driving-for-pleasure opportunities in the immediate vicinity of the project area.

Reasonably foreseeable actions in the Rainbow Valley include SR 303L construction, Hassayampa Freeway construction, Sonoran Desert Wildlife Protection Proposal implementation, and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. These potential developments would result in impacts to the existing recreation experience, setting, and opportunity.

The SVPP would convert approximately 84 to 98 acres of existing BLM land use from predominantly undeveloped desert land into a Parkway for the two-lane Parkway; approximately 167 to 195 acres of existing BLM land use from predominantly undeveloped desert land into a Parkway for the four-lane Parkway, and approximately 220 to 392 acres of existing BLM land use from predominantly undeveloped desert land into a Parkway for the six-lane Parkway.

4.19.13Travel Management

The area of analysis for cumulative impacts to travel management is both the extent of Rainbow Valley and the regional transportation planning area bounded by Maricopa County lines.

On a local level, the past and present land uses in Rainbow Valley have had a direct effect on the conversion of vacant lands to designated transportation routes. Past and present actions within the study area relevant to travel management have included the construction of SR 238 and utility roads for both EPNG and Transwestern; and the expansion of the city of Goodyear through the annexation of BLM lands.

On a regional level, the MAG has developed a regional transportation plan in response to urban and exurban growth. Included in MAG's regional transportation planning process, are plans for the SR 303L, a major transportation corridor with three general purpose lanes in each direction and an option for future high-occupancy vehicle lanes and a fourth outside lane. SR 303L will generally extend west from I-17 at Lone Mountain and head southwest to Grand Avenue, south near Cotton Lane to I-10 and terminate near MC-85/Buckeye Road. Recommendations for extending SR 303L from SR 30 south to connect with I-8 are also being considered. Depending on the final alignment of the southernmost portion of SR 303L, this roadway will likely serve as an important connection to and from the Parkway within the context of regional transportation. In addition, the I-11 corridor is also being considered as an interstate connection from Arizona to Nevada. Though the roadway is currently in the initial studies of feasibility and planning, a portion of I-11 could pass through the southern Goodyear area, providing an additional high-capacity transportation corridor. The I-11 and SR 303L roads are currently under study and the final design and construction is not funded, scheduled, or programmed at the time of this analysis.

Reasonably foreseeable actions in the Rainbow Valley include the addition of two major roadway corridors, as well as anticipated residential and commercial growth. This potential development would result in further changes to travel management within the area. Anticipated population growth in the area is one of the primary reasons prompting the expansion of existing and proposed transportation routes such as the SVPP. Such expansion would accommodate existing and future commuters in the area.

4.19.14 Special Designations

The analysis area that was used to assess cumulative impacts to special designations is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing special designations, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The past and present land uses in Rainbow Valley have had a direct effect on the special designations in the area. Agricultural and recreational activities in the Rainbow Valley created the road network still in use today. The SDNM was created to protect some of the natural and cultural resources of the mountains to the west of Rainbow Valley, including the Mormon Battalion Trail/Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor. The Arizona Desert Wilderness Act of 1990 enabled the creation of the North Maricopa Mountains, South Maricopa Mountains, and Sierra Estrella Wilderness areas.

Reasonably foreseeable actions in the Rainbow Valley include SR 303L construction, Hassayampa Freeway construction, Sonoran Desert Wildlife Protection Proposal implementation, and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. These potential developments would further alter the existing landscapes and would represent a cumulative impact to special designations. The SDNM and Wilderness areas within the analysis area are managed to protect the biological, scientific, and historical resources and the wilderness character of BLM lands, respectively. Future roadways and community expansion, while not occurring directly within any special designations, are not purposed for management of biological, scientific, and historical resources and wilderness character of BLM lands. Future development in the analysis area would result in the removal of vegetation communities (both native and agricultural) that would impact wildlife and reduce or change their habitat. Future expansion of surrounding communities would convert more lands to structures and urban landscaping. Additional roads and structures reduce available habitat, block or alter wildlife movement, and would likely result in disturbance of cultural and heritage resources. The additive effect to special designations would, over time and as the reasonably foreseeable activities are implemented, result in adverse cumulative effects to the special designations in local area. The cumulative effect would be moderate and long-term.

Further cumulative analysis regarding the biological, scientific, and historical resources of special designations can be found in the Vegetation, Wildlife, and Cultural and Heritage Resources sections of this chapter, respectively.

4.19.15 Noise

The area of analysis for noise-related cumulative impacts is the extent of the SVPA. The SVPA represents a reasonable region in which existing Category B land uses, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The past and present actions in the SVPA have had a direct effect on existing noise levels in the area. Land in the SVPA is largely undeveloped and is characterized by vacant desert, agricultural lands, and by areas used for grazing, mining, utilities, recreation, and widely dispersed, low-density residential development. Past recreation use consists mostly of hiking, hunting, horseback riding, and driving for pleasure. The combination of sparse development and the lack of a substantial transportation network have contributed to the low 1-hour equivalent noise levels measured in the area. Present actions have not significantly changed the rural character of the area.

Reasonably foreseeable actions in the SVPA include the implementation of the Hassayampa Freeway construction and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. These potential developments would result in increased urbanization of the area and the increased proximity of Category B land uses to an expanded local roadway network. Peak hour noise levels could potentially increase due to increases in traffic and roadway design speeds. Future mitigation measures to decrease the impacts of noise (e.g., sound walls, etc.) are unknown at this time.

4.19.16 Hazardous Materials and Public Safety

The area of analysis for hazardous materials and public safety cumulative impacts to land uses is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing land uses, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The list of identified future actions includes expansion of the SVPP up to six lanes, SR 303L construction, Hassayampa Freeway construction, various pipelines, and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. These potential projects and developments would result in additional use of hazardous materials and increased quantities of generated solid waste during their construction phases, additional transportation of hazardous materials through the area of analysis during their use, and additional generation of solid waste after the communities are developed. However, it should be noted that like the SVPP, these types of projects are also required to implement safety-related plans and programs to ensure safe handling, storage, and use of hazardous materials. Therefore, implementation of proper mitigation measures by the construction companies, as well as compliance with federal, state, and local regulations, would provide sufficient mitigation to ensure that there would be no direct or indirect impacts from the use of hazardous materials or the generation of solid waste by these activities.

4.19.17 Social and Economic Resources

The CEQ defines cumulative effects as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions.” The cumulative impacts evaluated for the proposed Parkway for socioeconomic and environmental justice conditions were analyzed within both geographic and temporal boundaries. The geographic area of analysis for cumulative impacts to social and economic conditions includes the communities of Goodyear and Maricopa, as well as the Rainbow Valley area (roughly bounded by Patterson Road to the north, to 4 miles south of SR 238; and to the east, the Maricopa–Pinal County boundary, 6.5 miles west of the existing city of Maricopa, to the boundary of the SDNM to the west). Because census tract information was used to inform the environmental justice analysis, the geographic analysis area does exceed this geographic boundary for population and income data. The temporal bounds of analysis for cumulative impacts are defined by build-out conditions. MAG has forecasted population and commercial growth for the region, so although no exact timeframe exists, for planning purposes the build-out (or the eventual final development scenario) is expected to occur within 35 to 60 years.

The City of Goodyear annexed additional land to the south (the Rainbow Valley Planning Area) for the express purpose of assuring quality development and comprehensive planning for critical land uses, transportation, and infrastructure and to avoid private land “islands” (City 2007). Thus, the contiguous lands to the south of Goodyear that comprise the Rainbow Valley are included in the City of Goodyear General Plan as future residential and commercial development, which is expected to accommodate the increase in the current population of up to 202,000 residents and 57,000 jobs at build-out conditions in

Rainbow Valley alone. As with all cities located in hinterlands of the greater Phoenix metropolitan area, the City of Goodyear continues to plan for inevitable growth in the coming decades. Although this growth is primarily market-driven, planning for future conditions promotes responsible, contiguous, and sustainable growth to avoid "leap-frog" development that promotes inefficiency in circulation and access, longer commutes, and lack of access to city amenities such as transit and infrastructure. As such, one of the primary cumulative effects of the proposed Parkway would be the addition of transportation access, including public transit, to an area where there currently is limited or no access, while additional transportation development (unrelated to the SVPP) is also being considered for future high-capacity transportation development (i.e., Interstate freeway systems), allowing for increased circulation of people, services, and goods locally and regionally.

Several past, present, and future actions could affect social and economic conditions within the area of analysis. The annexation of the Rainbow Valley Planning Area by the City of Goodyear and the inclusion of these lands in the City's General Plan allows for future development where little or no development currently exists. This would result in higher land values, and increased property tax and sales tax revenues. Future actions also include the planned addition of high-capacity, multi-modal transportation corridors that span the region and state. The expansion of the regional and Interstate transportation network is planned for areas where there is demand for new or improved roads and connections. These new transportation facilities are in the process of being evaluated and will include multi-modal considerations such as passenger rail and conventional transit. The addition of transit options enhances mobility, provides economic benefit, and improves air quality conditions through reduced gasoline consumption (American Public Transportation Association 2012).

Transportation and community planning studies are typically a collaboration between local governments, MAG, and other agencies and have implications for the extended planning effort beyond the adopted RTP or General Plan timeframe. Given current and expected population growth, these planning studies provide a perspective on future transportation needs and long-range planning.

Initial population and employment growth projections from 2007 indicate that a portion of the SVPA (from central Goodyear to Mobile along the Waterman Wash) would experience high development. Given the slowdown of development due to the economic downturn, these projections are tentative. However, MPAs and planning agencies are generally certain that population growth and build-out conditions will be met and the slowing of growth is temporary, which allows agencies the opportunity to plan for future growth within a longer timeframe.

Both the Hidden Valley Transportation Framework Study and the Goodyear General Plan indicate that there are several major master planned communities in various stages of development: Estrella (active; 51,070 total dwelling units), King Ranch (active: 5,413 total dwelling units), Amaranth (planned: 41,261 total dwelling units) and Vekol Valley (status unknown). These master-planned communities represent over 100,000 new residential dwelling units of low- and medium-density development. Commercial and employment development is also planned in this area, including the eventual creation of a village core.

MAG socioeconomic projections for 2035 show growth within Goodyear and the SVPA increasing exponentially (Table 4-37). Employment projections for 2035 within Goodyear are also expected to increase to 156,725, and to 36,905 within the SVPA (MAG 2009).

This substantial growth within Goodyear and the SVPA coupled with equally substantial growth projections for Buckeye, Maricopa, and Avondale will result in formidable increases in vehicular travel demand for both home-based and job-based trips within the region. Specifically, over 1 million vehicle trips per day are estimated within the SVPA at build-out conditions, or when Goodyear's General Plan is fully implemented (MAG 2009). Adjacent communities such as Buckeye, Maricopa, and Mobile are also planning for significant population, employment, and land area growth within the next two decades.

Table 4-37. Population Growth within Goodyear and the SVPA

Location	Current Population (2010)	Projected 2035 Population	Projected Build-out Population
City of Goodyear	65,178	358,565	511,000
SVPA	100*	60,629	202,000

Sources: MAG (2009); City of Goodyear (2009).
*Note: Estimated population.

In considering the cumulative effects to economics related to livestock grazing, for both the Beloat and Conley allotments, reasonably foreseeable actions including the SR 303L, I-11, and solar development will likely increase urban development throughout the area, potentially causing these two livestock operations to be untenable, particularly for the Conley allotment. Fragmentation of pastures would require hands-on effort to facilitate livestock movement; a major shift in the current "free-range" nature of the Beloat and Conley allotments (north of Patterson road notwithstanding due to the mandates of Article 7-4). The cumulative impact of the SVPP in combination with other future development would have a major, long-term impact to the economics of livestock grazing in the area of analysis.